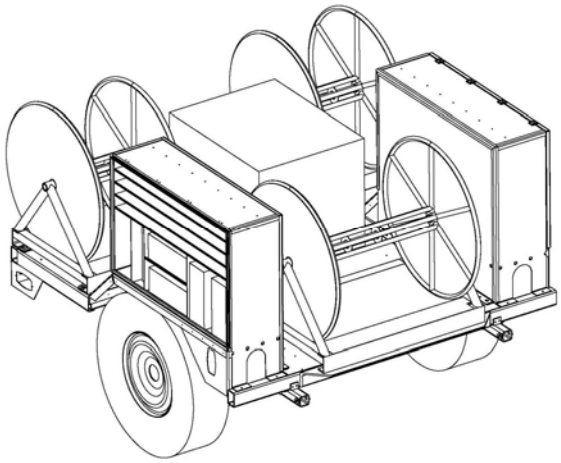
TECHNICAL MANUAL

OPERATOR'S AND MAINTENANCE MANUAL



HIGH MOBILITY CABLE TRAILER

Model T-100-H

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17 APRIL 2012

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WARNING SUMMARY

HANDLING

Care should be taken to avoid unnecessary shock. Do not drop.

HEAVY COMPONENTS

Use caution when handling heavy parts. Lifting device is required when parts exceed lift and carry limits in MIL-STD-1472F, "Human Engineering". Failure to follow this warning may result in injury or death.

HIGH VOLTAGE

The power boxes and cables contain electrical circuits and electric discharges operating at high voltages. The high voltages are fully contained and are not accessible except during servicing.

FIRST AID DATA

FIVE SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

(1) Do not try to pull or grab the individual.
(2) If possible turn off the electrical power.
(3) If you cannot turn off the electrical power, pull, push or lift the person to safety using a wooden pole, a rope, or some other insulating material
(4) Send for help as soon as possible
(5) After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start resuscitation.

Refer to FM21-11 for first aid procedure.

PINCH POINTS

The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

TRAILER CHASIS

See Army technical manual TM 9-2330-392-14&P for warnings regarding the trailer chassis.

GENERATOR:

See Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1) for warnings regarding the generator.

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TECHNICAL MANUAL

OPERATOR'S AND MAINTENANCE MANUAL
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

HIGH MOBILITY CABLE TRAILER
Model T-100-H (TGCC - 259)

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HOW TO USE THIS MANUAL

DESCRIPTION OF THE MANUAL

This manual is designed to help you operate and maintain the High Mobility Cable Trailer (HMCT). Warning pages are located in the front of this manual. Read the warnings before operating or performing maintenance on the equipment.

The major elements of this manual are chapters and sections. There are five chapters. The Table of Contents is provided for quick reference to the subjects covered by each chapter and section. Most chapters contain a chapter index that lists the chapter sections and paragraphs.

Each chapter is divided into sections. Each section is divided into descriptive paragraphs. The paragraphs have specific information about the HMCT. Tables and illustration are used to provide information in a concise form.

All major paragraphs are numbered and have a name (sidehead). All tables have table numbers and titles (names). Some illustrations have figure numbers and titles (names). The paragraph sideheads and table and figure titles are chosen to describe the information in that paragraph, table, or figure. The paragraph, table, and figure numbers consist of the chapter number, followed by a dash and a sequential number.

CHAPTER 1

INTRODUCTION

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SECTION I. GENERAL INFORMATION

1-1 SCOPE

a. Type of manual

Operator's and General Maintenance Manual, including Repair Parts and Special Tools List.

b. Model number and equipment names

High Mobility Cable Trailer (HMCT) model T-100-H.

c. Purpose of equipment

Carry cables and auxiliary equipment for charging Carmanah runway lights.

d. Location terms

Throughout this manual, the terms “front”, “rear”, “top”, “bottom”, “starboard side”, and “port side” are used to describe the views of the HMCT. The front is the side with the hitch. The rear is the side with the tail lights. The port side is the side on the right when looking from the front. The starboard side is the side on the left when looking from the front.

1-2 MAINTENANCE FORMS, RECORDS, AND REPORTS

Marine Corps units using the Asset Tracking Logistics and Supply System (ATLASS) will maintain forms and records information in accordance with applicable ATLASS requirements. All other Marine Corps units will maintain forms and records associated with operating and maintaining ground equipment, as prescribed by TM 4700-15.

1-3 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your HMCT needs improvement, let us know. Send us an Equipment Recommendation Report (EIR). You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to Carmanah Technologies Corporation, 250 Bay Street, Victoria, BC, V9A 3K5. We will send you a reply.

1-4 CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of military materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of the materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust,' "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to Carmanah Technologies Corporation, 250 Bay Street, Victoria, BC V9A 3K5.

1-5 DESTRUCTION OF MATERIAL TO PREVENT ENEMY USE

For information on destruction of materiel to prevent enemy use, refer to TM 750-244-6.

1-6 LIST OF ABBREVIATIONS

The following is a list of abbreviations for the High Mobility Cable Trailer and associated systems. Some terms listed below may not be used in this document.

AC	alternating current
ADB	ADL Airfield Solutions, Inc.
AGL	Above Ground Level
ANSI	American National Standards Institute
ATLASS	Asset Tracking Logistics and Supply System
AWG	American Wire Gauge
BIT	Built-In-Test
CFR	Code of Federal Regulations
CPC	Corrosion Prevention and Control
COTS	Commercial Off-the-Shelf
DC	direct current
EDLT	Runway Edge Light
EIR	Equipment Improvement Recommendations
EMI	Electromagnetic Interference
FAA	Federal Aviation Administration
FLIR	Forward Looking Infrared
HMTC	High Mobility Cable Trailer
IMC	Instrument Meteorological Conditions
IR	Infrared
LED	Light Emitting Diode
LRLS	Long-Range Line-up System
LZ	Landing Zone
LZLT	Landing Zone Light
MTBF	Mean Time Between Failure
MTBOMF	Mean Time Between Operational Mission Failure
MTTR	Mean Time To Repair
HMMWV	High Mobility Multipurpose Wheeled Vehicle
NVD	Night Vision Devices
NVG	Night Vision Goggles
PALS	Portable Airfield Lighting System
PDU	Power Distribution Unit
PMCS	Preventive Maintenance Checks and Services
PSB	Power Supply Boxes
STE	Special Test Equipment
TDZ	Touchdown Zone
TGCC	Trailer with Generators and Charging Cable
THLT	Runway Threshold Light
VHF	Very High Frequency

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1-7 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Characteristics

(1) High Mobility Cable Trailer (HMCT)

b. Capabilities and features

(1) Towable by a High Mobility Multipurpose Wheeled Vehicle (HMMWV).
(2) Attachment points for sling loading
(3) Transports all of the components to charge the runway lights of the a 8,000-foot runway

The HCMT T-100-H is a component of a portable airfield lighting system that provides storage, transport, and power of charging cables and auxiliary equipment for the Carmanah landing field runway lights.

General Description

The HMCT model T-100-H stows and transports all of the charging cables and ancillary components for a 8,000-foot runway. The trailer equipment includes: a 3kW generator, Power Distribution Units, charging cables; Power Supply Boxes; Cable Protectors; and tie-down stakes.

General Performance Requirement

The HMCT provides a high mobility platform for transport, deployment, recovery, and powering of charging cables for Carmanah runway lights. The HMCT T-100-H provides for an 8,000-ft runway.

1-8 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

a. Trailer Chassis

The HMCT model T-100-H is based on a standard U.S. Army specification high mobility flat deck trailer, model LTT-F. The manual for this chassis is TM 9-2330-392-14&P. The maximum vehicle weight is 4200 lbs. The overall length is 132 inches and the overall width is 85.6 inches. The track width is 72.5 inches. The ground clearance is 16 inches. The drawbar height is 29.5 inches. The wheels are 16.5 x 8.25 HMMWV compatible 8 on 6.5 inch bolt pattern. The tires are 37x12.50R Goodyear Wrangler M/T with run-flat inserts, HMMWV compatible. It has fully independent progressive rate trailing arm suspension. The shock absorbers are telescopic, direct acting, HMMWV compatible. The electric system is 24 VDC sealed lighting system with blackout convoy lights, 12 pin connector plug mates with HMMWV. The trailer chassis is painted desert tan.

This trailer chassis has been modified to store and transport the charging cables and ancillary equipment for the Carmanah runway edge lighting system. The major modifications are all additions to the basic trailer. No structural members have been compromised. Supports have been added to mount the generator. Reel carriages that slide out have been added to both the port and starboard sides in the front. A third reel has been added to the rear. A hydraulic winch system to operate the cable reels has been added above deck. Locking storage cabinets have been added to both the port and starboard sides. A storage rack that is accessible from the rear has been added below the deck.

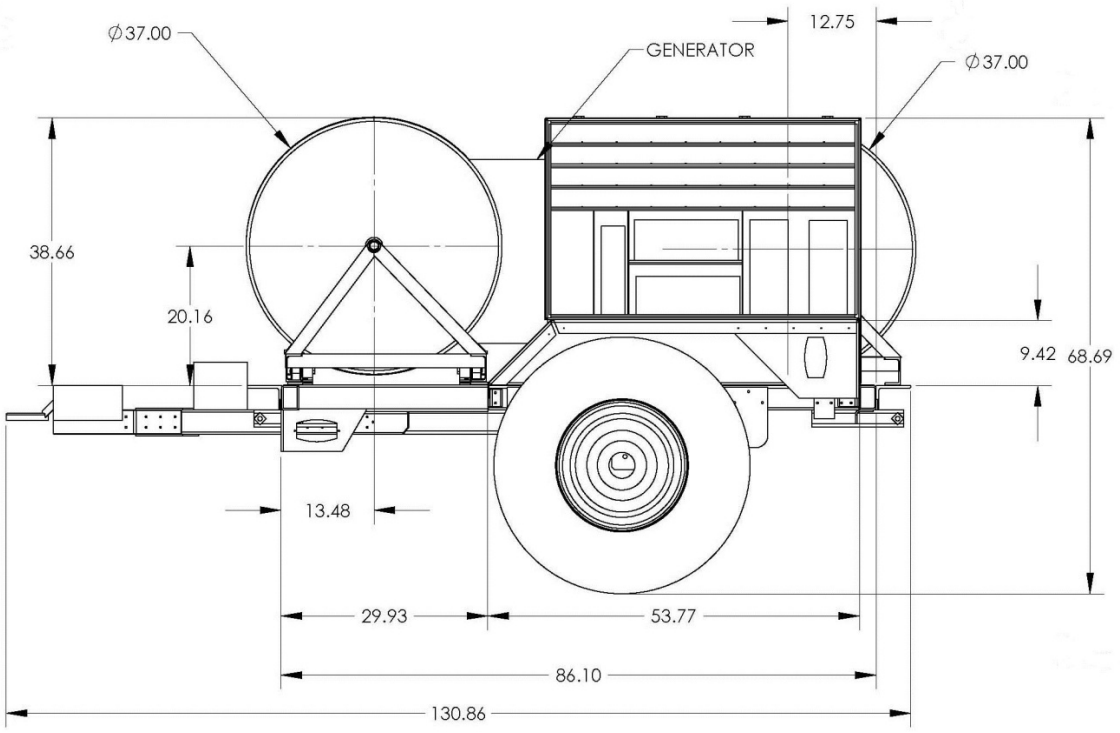

Figure 1-1: Port side view of the HMCT with dimensions (inches)

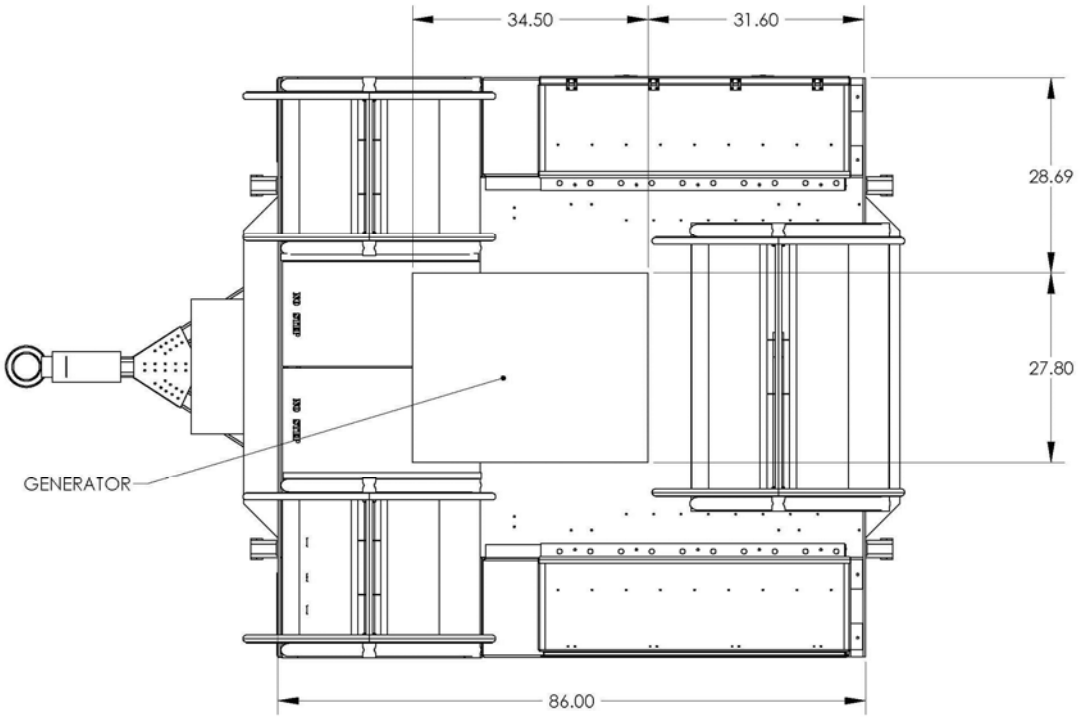

Figure 1-2: Top view of the HMCT with dimensions (inches)

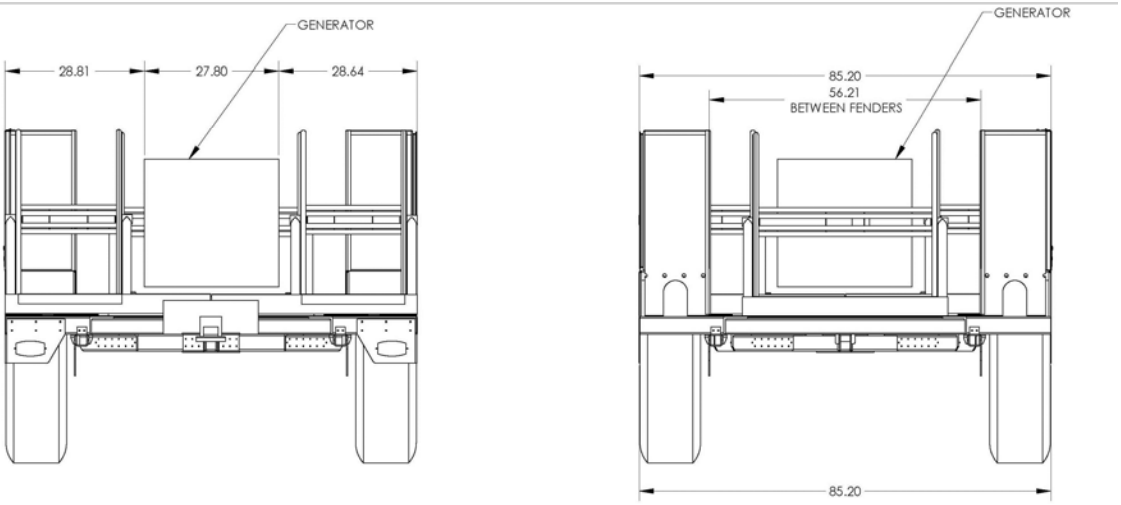

Figure 1-3: Front (left) and rear (right) views of the HMCT with dimensions (inches)

b. Generator

The 3 kW tactical quiet generator set is located in the center of the trailer. It is a standard U.S. Army specification generator MEP-831A (60Hz). The manual for this generator is TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1). The power output of the generator is 3kW at 0.8 power factor. It is connected to have 120/240 VAC, 3-wire output. The fuel tank capacity is 8 hours and uses JP-8, DF-2, and DL-2. It is 34.5 inches long, 27.9 inches high, and 26.5 inches high. Its weight without fuel and battery is 270 lbs.

The generator has been modified so that the start cord is pulled vertically instead of horizontally.

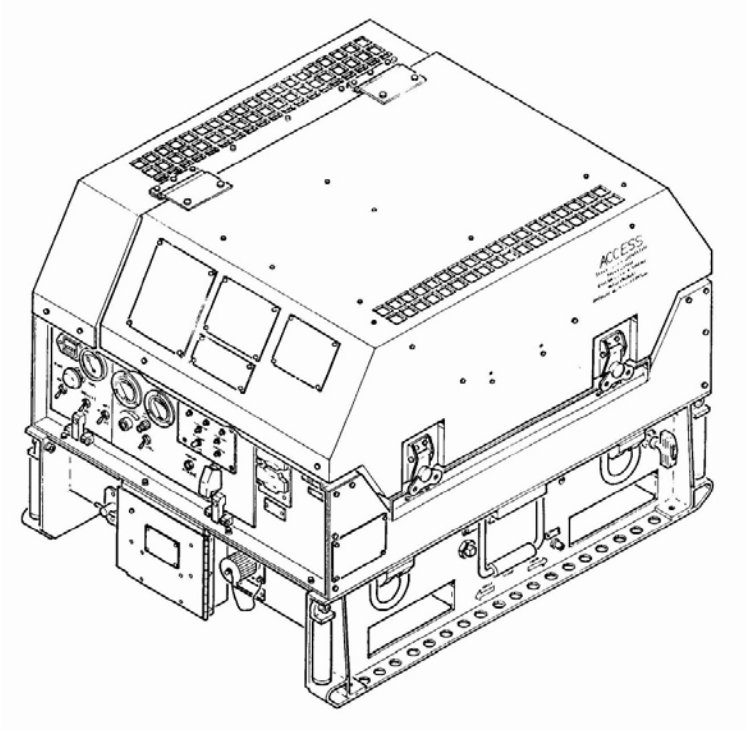

Figure 1-4: Line drawing of the 3kW tactical quiet generator

c. Hydraulic system

The hydraulic winch system for operation of the cable reels is located on the deck of the trailer between the generator and the starboard side cabinet. The control panel is located on the starboard cable reel carriage and is accessed from the front of the trailer. hydraulic lines go from the hydraulic system to each of the three cable reels. Hydraulic winches are located on the axels of each of the three cable reels. A manual freewheel switch is located on each cable reel.

Figure 1-5: Front view of the trailer with both side cable reels extended to show the hydraulic system. The hydraulic pump is to the left of the generator. On (green)-off (red) buttons are located on the starboard reel carriage. Hoses go to hydraulic winches on the axels of each cable reel. Manual freewheel switches are located on each cable reel carriage.

The hand-held controller for the hydraulic winch system is stowed in the lower left compartment of the port side cabinet. This controller operates the cable reels. It has internal rechargeable type AA batteries. A commercial recharger that operates on 115 VAC and can be plugged into the generator is supplied for the rechargeable batteries. Alkaline type-AA primary batteries can also be used in the remote controller.

Figure 1-6: Hydraulic system hand-held remote controller for the cable reels

d. Power Supply Boxes

The Power supply Boxes (PSB) connect from the charging cables to the Carmanah runway lights. There are quantity 105 Power Supply Boxes stowed on the HMCT model T-100-H; 104 PSB are used for a nominal 8,000-ft long runway configuration and there is 1 spare. The Power supply Box is ADB part number 44A7235 Rev A. The dimensions of the PSB are 6 ¾ inches x 2 1/8 inches x 4 5/8 inches and it has a 16 AWG cable with a male 4-pin connector CVG06E18-10P; a 16 AWG, 3-wire with shield cable with a female 4-pin connector CVG01E18-10S; a 3-ft long cable with 3-pin connector CC3116P0-3P; and a ground lug. The entire assembly weighs 5.5 lbs. The Power Supply Boxes are located on the trailer in the two side cabinets.

Figure 1-7: Power Supply Box (PSB) assembly

e. 210-ft Charging Cables

The 210-ft cables are used to carry power between the runway edge lights. The nominal spacing of the runway edge lights is 200 ft, so that there is extra cable to account for variations in placement and topography. There are a quantity 98 of the 210-ft cables; 92 are used for the nominal configuration for a 8,000-ft runway and there are 6 spares. The 210-ft cables are composed of 16AWG, 3-wire with shield cable with a male 4-pin connector CVG06E18-10P on one end and a female 4-pin connector CVG01E18-10S on the other. The weight of each cable is 14 lbs. The 210-ft cables are located on each of the three reels: 30 are on the port reel; 30 are on the starboard reel; and 38 are on the rear reel.

Figure 1-8: 210-ft cable

f. 12-ft Charging Cables

The 12-ft cables are used to carry power between the threshold lights. The nominal spacing of the runway threshold lights is 10 ft, so that there is extra cable to account for variations in placement and topography. There are a quantity 20 of the 12-ft cables; 16 are used for the nominal runway configuration and there are 4 spares. The 12-ft cables are composed of 16AWG, 3-wire with shield cable with a male 4-pin connector CVG06E18-10P on one end and a female 4-pin connector CVG01E18-10S on the other. The weight of each cable is 2/3 lb. The 12-ft cables are located on the rear reel.

Figure 1-9: 12-ft cable

g. 520-ft Charging Cables

The 520-ft cables are used to carry power from the trailer to the runway. There are quantity 5 of the 520-ft cables; all 5 are used for the nominal runway configuration. The 520-ft cables are composed of 14AWG, 3-wire with shield cable with a male 4-pin connector CVG06E18-10P on one end and a female 4-pin connector CVG01E18-10S on the other. The weight of each cable is 45 lbs. The 520-ft cables are located on the rear reel.

Figure 1-10: 520-ft cable

h. Adapter Cables

The Male-to-Male adapter cable is used to connect the female end of the 520-ft cables to the female bulkhead fittings located on the rear of the trailer. There are quantity 2 of the adapter cables with no spares. The length of the adapter cable is 9-ft and it is composed of 14 AWG, 3-wire with shield cable with a male 4-pin connector CVG06E18-10P on each end. The connectors for the adapter cables are painted tan color. The adapter cables are located in the port side cabinet.

Figure 1-11: male-to-male adapter cable; the connectors are painted tan color (after this picture was taken)

i. Terminator Cables

The terminator cable is used to loop back the DC power thorough the ends of each line. There are quantity 3 of these terminator cables; two are used for the nominal runway configuration and there is one spare. The terminator cable is composed of a 1-ft long loop of 16 AWG, 3-wire with shield cable and a single female 4-pin connector CVG01E18-10S . Additional identification is supplied with wraps of yellow tape. The terminator cables are located in the port side cabinet.

Figure 1-12: terminator cable

j. Cable Protectors

Cable Protectors are used to cover the cables on the taxiways. There are quantity 10 cable protectors; the number used is site dependent. The cable protectors are Checkers Industrial Safety Products Model No. CP 1X125-CP-D0. They are constructed of all-weather polyurethane, are orange, and the outer dimensions are 11 ½ inches wide by 38 ¼ inches long and 2 inches high. Each cable protector weighs 11 lbs. The cable protectors are located in the storage bin under the trailer that is accessed from the rear.

Figure 1-13: Cable Protector

k. Keys

The side cabinets are locked with a key. There are quantity 8 keys. Initially the keys are located taped to the inside of the side cabinet doors. The key is Southco, Inc. number CH751.

Figure 1-14: keys for side cabinets

l. Tie-Down Stakes

Stakes are supplied to hold down the cables between the runway lights. There are quantity 200 stakes; The number used is site dependent. The stakes are 9 3/4 inches long by 3/8 inch diameter. The stakes are stowed underneath the generator and are accessed from the front.

Figure 1-15: cable tie-down stake

A grounding kit is supplied to ground the trailer. It is located in the storage bin under the trailer that is accessed from the rear.

m. Measuring Wheel

A measuring wheel is supplied to accurately and quickly measure the distances on the runway for location of the runway lights. It has a 3-piece telescoping handle and a 10 inch diameter wheel. Its digital display reads up to 10,000 feet. This is a Gempler's Digital Serial 31 Measuring Wheel.

Figure 1-16: Measuring wheel for measuring distances on the runway

The measuring wheel is stowed in a pouch that is attached to the back side of the starboard cabinet.

Figure 1-17: Measuring wheel stowed in a pouch on the back side of the starboard cabinet. Zipper shown open on left and with the zipper closed on the right.

The measuring wheel utilizes a 2/3-A lithium battery.

n. Runway Light Control Transmitter

A runway light control transmitter is inside a black pelican case that is stowed in the lower center drawer in the port side cabinet. This controller remotely controls the runway lights and the PAPI.

A spare runway light controller is attached with straps in the space between the generator and the port side cabinet. The space for the spare runway light controller is labeled with "SPARE TRANSMITTER STOWAGE" on the trailer deck and has a black strap for securing its black pelican case.

A laptop computer that is used to program the runway lights is stowed in the upper center drawer in the port side cabinet.

Figure 1-18: Looking inside the forward end of the port side cabinet. The runway light controller is located in the black case in the drawer in the lower right of the picture. The laptop for programming the runway lights is located in the drawer above the runway light controller.

Figure 1-19: Placard on trailer bed that indicates the stowage location of the spare runway light controller.

Figure 1-20: The spare runway controller case is secured with a strap.

o. Canvas Cover

There is a fitted canvas cover that envelopes the entire HMCT. The cover is attached to the trailer frame with snaps.

Figure 1-21: HMCT model T-100-H with the canvas cover.

Figure 1-22: The cover is attached to the trailer frame with snaps.

1-9 EQUIPMENT DATA

Equipment data for the trailer chassis may be obtained from Army TM 9-2330-392-14&P. Total weight of MHCT with all equipment onboard: 4,100 lbs (1860 kg)

Equipment data for the generator may be obtained from Army TM-9-6115-639-13&P (Marine Corps TM 10155A-OI/1). The circuit used is 240 VAC single phase 60 Hz at 16 A..

See your Carmanah Runway Lighting product documentation for equipment data for the Power Distribution Unit, cables, and Power Supply Boxes. See also Schaefer AC/DC Converter model C4788J-W-U017 for equipment data on the Power Distribution Units. The output of the Power Distribution units is 400 VDC at 5 A. The cables carry 400 VDC.

The hydraulic system utilizes a 3 HP variable volume vane-type pump that supplies 7.6 gpm at 1160 psi. The hydraulic system pump operates from 240 VAC, single phase. The solenoid valves for the hydraulic system operate on 120 VAC. Use petroleum-based hydraulic oil R&O type or ISO 32 46, or equivalent with a viscosity of 30 to 50 cSt.

See the Measuring Wheel Operating Instructions for equipment data on the measuring wheel.

Use petroleum-based hydraulic oil R&O type or ISO 32 46, or equivalent with a viscosity of 30 to 50 cSt.

SECTION III. THEORY OF OPERATION

1-10 HIGH MOBILITY CABLE TRAILER MODEL T-100-H DESCRIPTION

The HMCT model T-100-H is based on a standard U.S. Army specification high mobility flat deck trailer, model LTT-F. This trailer chassis has been modified to store and transport the charging cables and ancillary equipment for the Carmanah runway edge lighting system. The major modifications are all additions to the basic trailer. No structural members have been compromised. The additions are:

(1) A 3kW military tactical generator;
(2) Two slide out reel carriages in the front and one fixed reel in the rear for storage, deployment, and recovery of charging cables;.
(3) Two locking storage racks on either side for Power Supply Boxes, terminator cables, adapter cables; and hand-held remote controllers.
(4) A storage rack underneath the trailer bed for storage of the cable protectors and grounding rod kit;
(5) A hydraulic winch system to control the reels for deployment and recovery of the charging cables;
(6) Power distribution units in the port side cabinet.

1-11 POWER SYSTEM DESCRIPTION

The 240 VAC output from the generator is input to two AC power switches on the rear of the port side cabinet. The output from each power switch is fed to a Power Distribution Unit that is located in the rear of the port side cabinet. The Power distribution Units (Schaefer AC/DC converter model C4788J-W-U017) each convert the 240 VAC to 400 VDC. This 400 VDC is output through female bulkhead connectors on the rear of the port side cabinet. The charging cables attach to both bulkhead connectors and carry the 400 VDC around the runway.

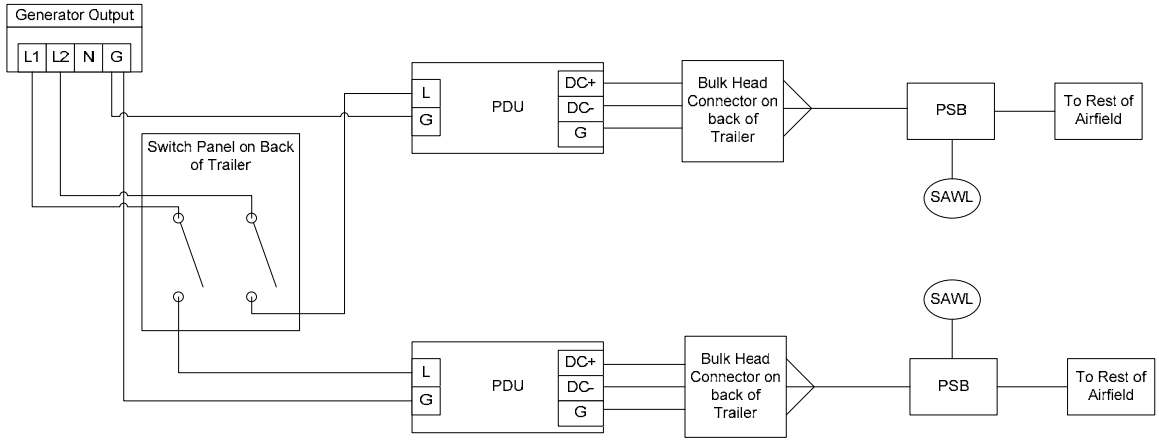

Figure 1-23: Functional diagram of the electrical system for charging the runway lights.

Figure 1-24: The rear of the port side cabinet. The two Power Distribution Units are located behind the high voltage shield. The AC power switches are mounted on the rear of the port side cabinet above the "AC POWER" sign. One of the two bulkhead connectors for 400 VDC to the charging cables is shown connected to an adapter cable.

Figure 1-25: Power connections on the rear of the port side cabinet. The AC power switch on the left controls DC output of the left connector and the AC switch on the right controls DC power to the connector on the right. The connector for the ground wire is below.

One of the charging lines is laid out from the trailer to the near side of the runway in the following sequence: adapter cable; two 520-ft cables; four 12-ft cables for threshold lights; thirty 210-ft cables from the starboard reel; sixteen 210-ft cables from the rear reel; four 12-ft cables to the threshold lights; and a terminator cable. The other charging line is laid out from the trailer to the far side of the runway in the following sequence: adapter cable; three 520-ft cables; four 12-ft cables for threshold lights; thirty 210-ft cables from the port reel; sixteen 210-ft cables from the rear reel; four 12-ft cables to the threshold lights; and a terminator cable. At each junction in the charging line there is a Power Supply Box ("PSB") that continues the 400 VDC circuit and leads power to a runway light to charge it.

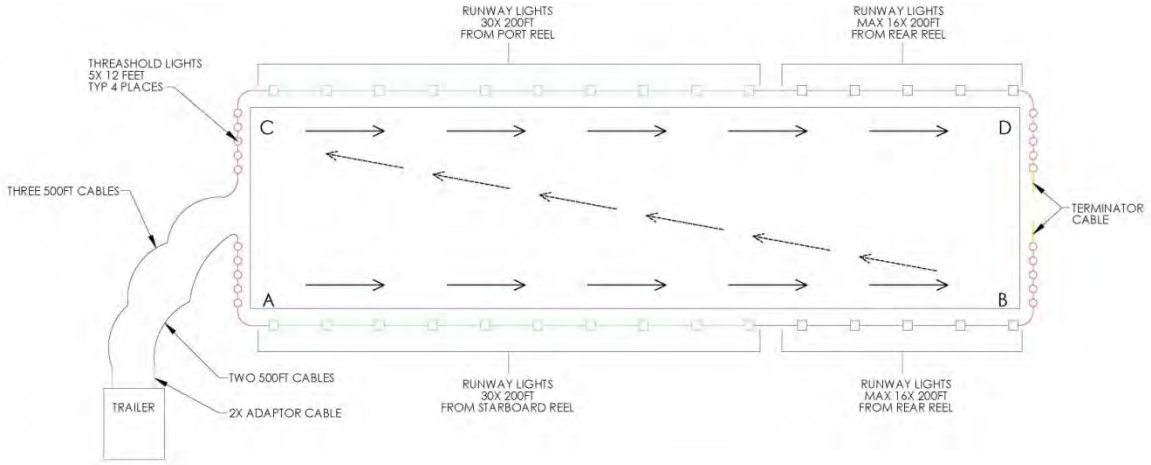

Figure 1-26: Schematic diagram of the layout of the charging cables for the runway lights. Note that the effective separation distance, not the cut length is used for the 210-ft and 520-ft cables.

1-12 HYDRAULIC SYSTEM DESCRIPTION

The hydraulic system is utilized to move the cable reels for deploying and recovering the charging cables. The 240 VAC, 60 Hz output from the generator is input to the hydraulic system pump motor and a step-down transformer that lowers the voltage to 120 VAC. Switches then direct the 120 VAC to solenoids on hydraulic valves that control the actions of the hydraulic system.

The hydraulic system utilizes a 3 HP variable volume vane-type pump that supplies 7.6 gpm at 1160 psi. A pressure-compensated, electrically-variable proportional flow regulator is used to vary the flow of hydraulic fluid, which controls the speed of the cable reels. Wet-type solenoid-operated directional control valves are used for each reel to control the direction of rotation of the cable reels. A hydraulic winch motor is located on the axis of each cable reel. Solenoid-operated, 2-way, normally closed, piloted poppet-type, screw-in hydraulic cartridge valves are used to select freewheel operation.

The pump is started and stopped by buttons that are located on the hydraulic system electrical box which is mounted on the starboard side reel carriage and is assessed from the front of the trailer. A hand-held remote controller is used for operation of each of the cable reels. The controller is used to select the reel to be controlled, the direction of rotation of the reel, and the speed of rotation. The controller also has an emergency kill button.

Figure 1-27: Hydraulic System electrical box. The upper, green button starts the pump and the lower, red button shuts off the pump.

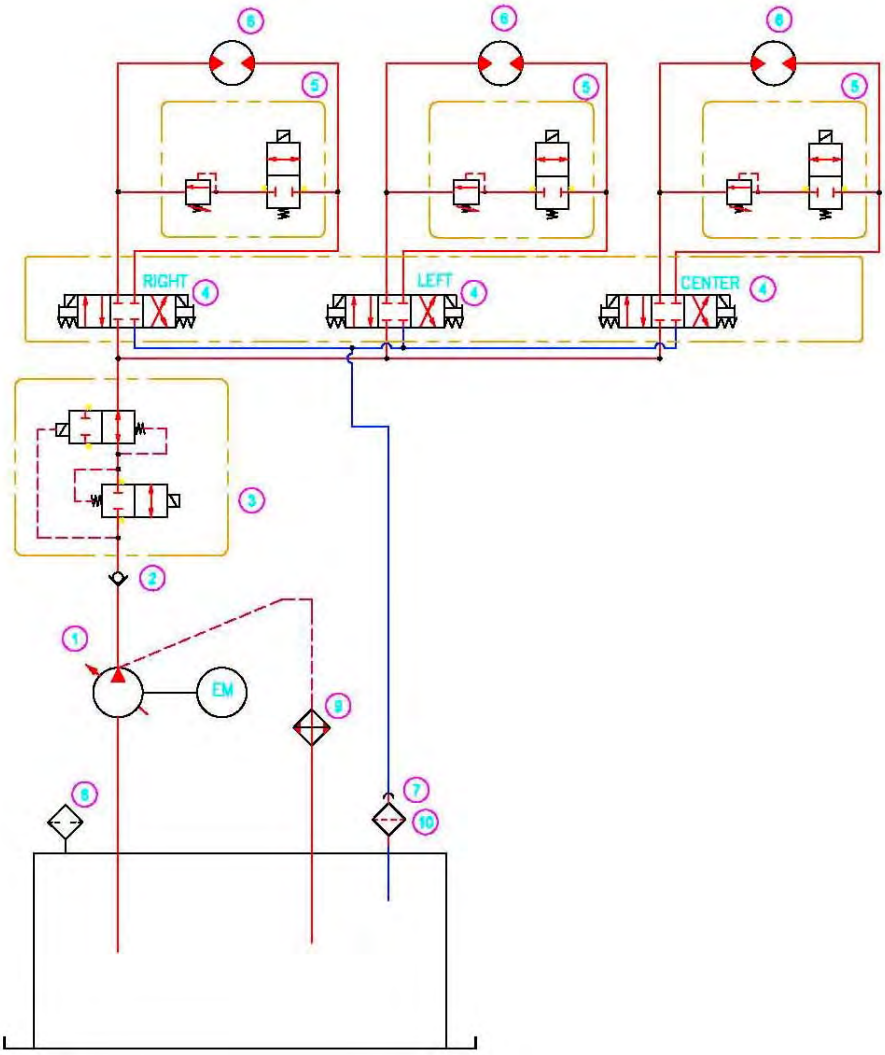

Figure 1-28: Schematic diagram of the flow through the hydraulic system: 1. pump; 2. check valve; 3. proportional flow control valve; 4. directional control valve; 5. motor free wheel valves; 6. winch motor; 7. return filter; 8. breather; 9. heat exchanger; 10. filter element. The reservoir is at the bottom.

CHAPTER 2

OPERATOR INSTRUCTIONS

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SECTION I. DESCRIPTION AND USE OF OPERATOR CONTROLS AND INDICATORS

Controls and indicators information for the trailer chassis may be obtained from Army TM 9-2330-392-14&P.

Controls and indicators information for the generator may be obtained from Army TM-9-6115-639-13&P (Marine Corps TM 10155A-OI/1).

Refer to your Carmanah Runway Lighting product documentation for information on controls and indicators for the Power Distribution Unit, cables, and Power Supply Boxes. See also Schaefer AC/DC Converter model C4788J-W-U017 for the Power Distribution Units.

See the Measuring Wheel Operating Instructions for controls and indicators for the measuring wheel.

Controls specific to the HMCT T-100-H are as follows:

(1) Hydraulic Winch System Control Panel
    (i) turns on and off the hydraulic winch system
(2) Hydraulic Winch Remote Controller
    (i) controls pay out, haul in, and speed of each of the three cable reels
    (ii) allows freewheeling of each of the three cable reels
(3) Side Cable Reel Carriages
    (i) spring clamps, one each reel: lock carriage in/out for storage or deployment.
    (ii) cable reel tie straps: secures the cable reel from rotation.
    (iii) controlled by hydraulic winch hand-held remote controller
    (iv) manual freewheel switch
(4) Rear Cable Reel
    (i) cable reel tie straps: secures the cable reel from rotation.
    (ii) controlled by hydraulic winch hand-held remote controller
    (iii) manual freewheel switch
(5) Side storage shelves
    (i) key lock: Southco CH751
    (ii) handle/latch: 1/4-turn counterclockwise to unlatch, clockwise to secure
(6) Below Deck Storage
    (i) four wing-nut fasteners: 1/4-turn counterclockwise to unlatch, clockwise to secure

SECTION II. OPERATION UNDER USUAL CONDITIONS

2-1 SITE REQUIREMENTS

The trailer must be located within 1,000 ft of a corner of the runway. The limitation is due to the length of the two 520-ft charging cables that extend from the trailer to the threshold lights at the nearest corner of the runway. The exact location of the trailer is site dependent.

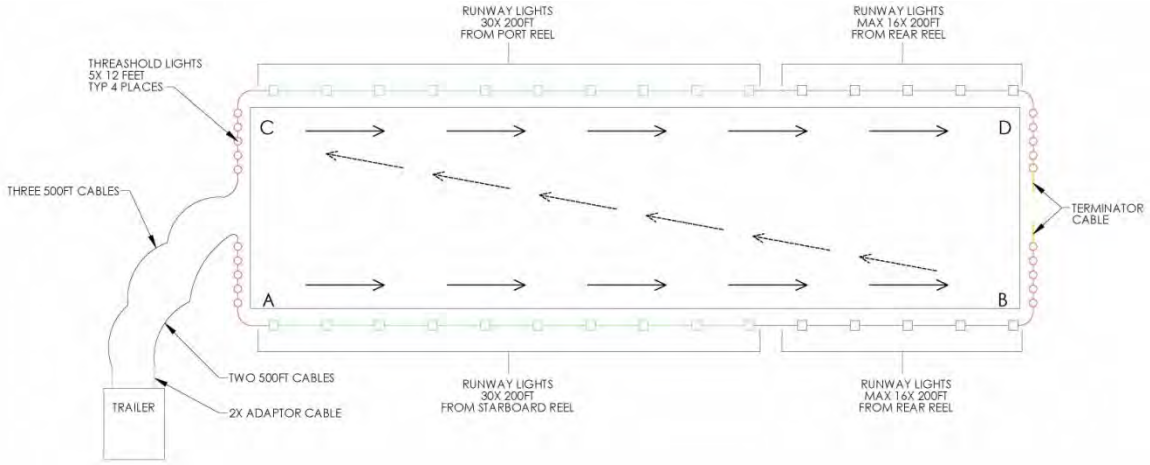

Figure 2-1: Schematic diagram of the layout of the trailer and charging cables. The trailer must be located within 1,000 ft of a corner of the runway.

2-2 ASSEMBLY AND PREPARATION FOR USE

The HMCT T-100-H comes fully equipped from the manufacturer. There are no components to install.

Set the brakes on the wheels. Lower the front jack stand on the trailer. Lower the rear stabilizers on the trailer. Chock the wheels. Remove the wooden stand that is bolted onto the tow ring at the front of the trailer.

> WARNING! If trailer is not coupled to the towing vehicle, ensure that the front leg is down and locked, the parking brakes are applied, the wheels are chocked, and the rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.

Remove the canvas cover. Open the side cabinets and remove the keys that are taped onto the inside of the cover.

Fill fuel tank of generator with fuel. There is a fuel filter tied onto the hydraulic system frame that is used to reach the fuel inlet.

Figure 2-2: Use the fuel funnel to add fuel to the generator.

Start the generator and check that the AC output voltage of the generator is 240 VAC. NOTE: the generator was set to 240 VAC during initial testing, so adjustment should not be required. Adjust the voltage to 240 VAC , if necessary.

Check for loose fittings in the hydraulic system. Check the site level in the hydraulic winch system for hydraulic fluid.

Perform all BEFORE PMCS (Preventive Maintenance Checks and Services) in Army technical manual TM 9-2330-392-14&P for the trailer chassis. Perform all BEFORE PMCS in Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1) for the generator. Perform all BEFORE PMCS as detailed in your Carmanah Runway Lighting product documentation..

Review all towing vehicle operating instructions in Army technical manual TM 9-2330-392-14&P for the trailer chassis before coupling or uncoupling the trailer.

2-3 INITIAL ADJUSTMENTS, BEFORE USE AND SELF-TEST

Perform any Initial adjustments in Army technical manual TM 9-2330-392-14&P for the trailer chassis.

Perform any initial adjustments in Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1) for the generator. **Adjust the AC output voltage of the generator to 240 VAC.**

Perform any initial adjustments to your Runway lights as indicated in your product documentation

a. Checking Unpacked Equipment:

With the trailer and tow vehicle on level ground, untie cover and store in a convenient location. Inspect the general condition for of the HMCT for evidence of damage during shipment. Inspect all shelves and be sure that all components are in satisfactory condition and that none of the units have become unserviceable or damaged. Note any discrepancies. If the equipment has been damaged report the damage on SF 364, Report of Discrepancy.

WARNING! If trailer is not coupled to the towing vehicle, ensure that the front leg is down and locked, the parking brakes are applied, the wheels are chocked, and the rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.

b. Self-Test:

The HMCT T-100-H does not contain self-test options.

2-4 OPERATING PROCEDURES

a. Basic Trailer Operating Procedures

Operating procedures for the trailer chassis may be obtained from Army TM 9-2330-392-14&P.

NOTE: If possible, park tow vehicle and trailer on level ground. Under normal operation, the trailer must be coupled to the towing vehicle during all deployment and recovery of charging cables

DO THE FOLLOWING IF THE TRAILER MUST BE UN-COUPLED FROM THE TOWING VEHICLE.
Apply both hand brakes.
Securely chock both wheels.
Remove both rear stabilizers from storage location and install at rear of the trailer.
Lower stabilizer feet until they contact the ground.

WARNING! If trailer is not coupled to the towing vehicle, ensure that the front leg is down and locked, the parking brakes are applied, the wheels are chocked, and the rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.

WARNING!: Ensure that the weight load is evenly distributed. Too much weight at the front will make the trailer difficult to raise with the front support leg. Too much weight at the rear will cause the trailer to tip backward. Failure to follow these warnings may result in injury to personnel or damage to equipment.

b. Generator Operating Procedures

Operating procedures for the generator may be obtained from Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1).

Adjust the AC output voltage of the generator to 240 VAC.

c. Power Distribution Boxes, Charging Cables, and Power Distribution Units Operating Procedures

Operating procedures for the Power Distribution Unit may be obtained from the Schaefer AC/DC Converter model C4788j-W-U017 user's manual. Operating procedures for the power supply boxes may be obtained from your Carmanah Ruway Lighting product documentation.

d. Hydraulic System Operating Procedures

Turn on the generator to operate the hydraulic winch system.

Before operation of the hydraulic winch system, first check the sight level to ensure that there is hydraulic fluid in the reservoir.

Figure 2-3: The forward area of the hydraulic system. The pressure gauge is in the center, the filter gauge is the multi-colored gauge, and the sight gauge for the hydraulic fluid is at the bottom. The black cap on the right is the fill spout for the hydraulic fluid.

The master on-off switch for the hydraulic winch system is located on the control box that is mounted on the starboard cable reel carriage. Push the green ON button to start the hydraulic winch system and push the red OFF button to turn it off. When the hydraulic system is turned on, the pressure gauge will rise and hold at approximately 900 to 1000 psi.

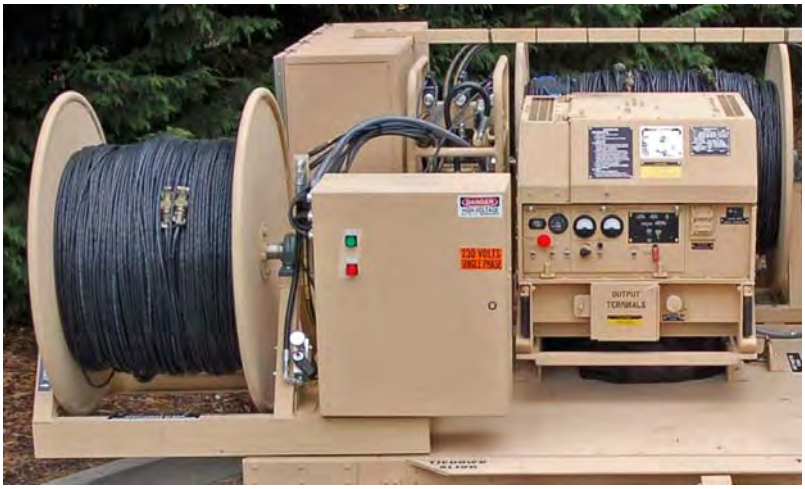

Figure 2-4: The hydraulic winch system on-off switch is located on the starboard reel carriage. The green button is ON and the red button is OFF. The manual freewheel switch is to the right of the starboard reel.

The cable reels are operated by a hydraulic winch system that is radio controlled from a hand-held remote controller. On the left side of the hand-held controller are toggle switches for turning the radio on and off and placing a reel in the freewheel condition. The AUX on-off switch is not operational in this system. The control in the upper right corner under WINCH is used to select the reel to be controlled: when switched up to the CENTER position, the rear reel is controlled; when switched to the LEFT position, the port-side reel in controlled; when switched to the RIGHT labeled position, the starboard reel is controlled. The self-centering large toggle switch near the center of the panel is pushed up to PAY OUT to deploy the cables and pushed down to the HAUL IN position to recover the cables. The dial switch in the lower right corner controls the speed of the chosen reel.

Figure 2-5: Control panel of the hydraulic system hand-held remote controller.

To use the hydraulic system hand-held remote controller, first start the generator. Turn on the RADIO switch; the status light will illuminate. Next select the reel to be controlled. Then with the speed dial at 0, push the switch to either PAY OUT or HAUL IN as desired. Adjust the speed dial to the desired rate.

Turning the freewheel toggle switch on will let the winch freely turn in the payout (deployment) direction, allowing the operator to pull the cable out by hand. The cable reel will not free wheel in the haul in (recovery) direction. The manual freewheel switches, which are mounted on the reel carriages, are operated by twisting counterclockwise and outwards. To go back to hydraulic system control, push the switch in and turn clockwise. The freewheel speed, or resistance to rotation, is adjusted with the aluminum knob, located on the frame of each cable reel. To increase resistance turn clockwise, and to decrease resistance turn counterclockwise. Adjusting the resistance properly will prevent unwanted cable from spooling off the reel. Switching the Freewheel switch to off returns complete control to the hand-held remote controller.

Figure 2-6: Freewheel switch and resistance dial.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

e. Side Cabinet Operating Procedures

To open a side cabinet, use one of the keys to unlock the two locks on a side cabinet. Turn each of the two handles counterclockwise a quarter turn so that the handles are horizontal. Pull on the handles and the side cabinet cover will lift up and out (it is hinged on the top). Pull the support rod from its spring latch and insert into the holder on the left side of the cabinet to hold the side cabinet door open.

Figure 2-7: Side cabinet key locks (top) and handles (bottom) shown on the port side cabinet door. With the handles in the horizontal position, as shown, the side cabinet is unlatched. The handles are rotated 1/4-turn clockwise to the vertical direction to latch the side cabinet doors.

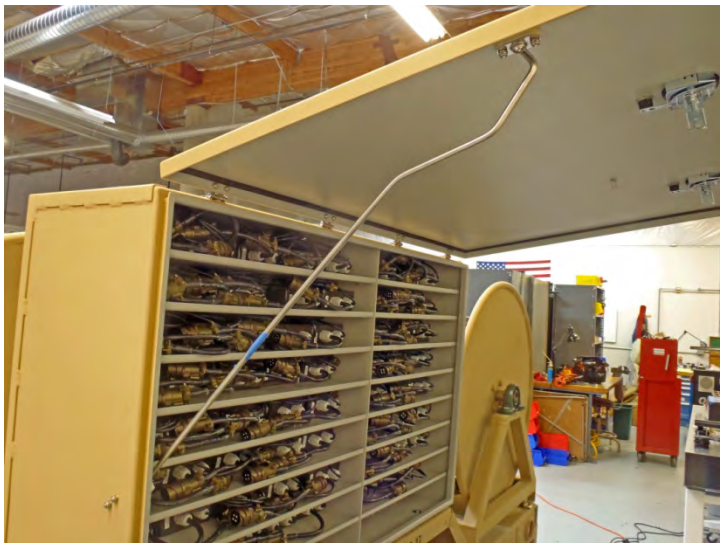

Figure 2-8: Side cabinet door support rod in place on the starboard side cabinet.

To close a side cabinet, reverse the above procedure. The handles are secured when they are vertical.

f. Under Deck Storage Operating Procedures

The under deck storage compartment is accessed at the rear of the trailer. To open the under deck storage, turn four 1/4-turn wing-nut captive fasteners counterclockwise and pull out. Remove the door, which is connected with lanyards.

Figure 2-9: Under deck storage. The four quarter-turn wing-nuts secure the door.

To secure the under deck storage compartment, place the door over the rear compartment so that the holes for the fasteners line up with the catches. Insert the four wing-nut fasteners and turn each 1/4-turn clockwise to secure.

To load the under deck storage, start with three cable protectors forming the bottom row with their wide side down. Place two cable protectors in the second row between those of the first row, but with the wide side up. Form the three row of cable protectors by placing three cable protectors above those of the first row with their wide side down. Place two cable protectors in the fourth row between those of the third row, but with the wide side up. Place the grounding rod kit to one of the sides.

Figure 2-10: Under deck storage open with cable protectors and grounding rod kit (to the right) stowed.

g. Operation of the Charging Cables

Make sure that the two AC power switches on the rear of the trailer are in the off position. Start the generator. After sufficient time so that the generator is running in a stable mode, flip one of the AC power switches on the rear of the trailer. After the generator has stabilized, flip on the other AC power switch.

WARNING! When the charging cables are energized there is 400 VDC all along the line of cables.

FIRST AID DATA

FIVE SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

(1) Do not try to pull or grab the individual.
(2) If possible turn off the electrical power.
(3) If you cannot turn off the electrical power, pull, push or lift the person to safety using a wooden pole, a rope, or some other insulating material
(4) Send for help as soon as possible
(5) After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start resuscitation.

Refer to FM21-11 for first aid procedure.

Note that the power supply boxes will operate in sequence down the charging cables and that it can take 30 minutes for power to reach the end of the lines.

Note that if one of the Power Distribution Units (AC to DC converters) fails, then the runway lights can be charged one side at a time by alternately switching the cables to the working receptacle.

h. Operation of the measuring wheel

Operating Instructions for the measuring wheel may be obtained from the Gempler's Digital Series 31 Measuring Wheel user's manual.

Press the ON/CLEAR button once to turn on. Press the ON/CLEAR button a second time to clear the reading. If the wheel is not operated for 3 minutes, it will turn off automatically.

Figure 2-11: Measuring wheel meter

i. Operation of the grounding rod

The grounding rod is driven into the ground. The wire in the grounding kit is connected from the grounding rod to the ground lug on the rear of the port side cabinet.

j. Operation of the cable tie-down stakes

The cable tie-down stakes are driven into the ground with the hook end securing the charging cable.

2-5 SEQUENCE OF DEPLOYMENT

The HMCT T-100-H trailer must be prepared for deployment as follows. With the trailer and tow vehicle on level ground, untie cover and store in a convenient location. Pay attention to Warnings, Cautions and Notes. Inspect all shelves and be sure that all components are in satisfactory condition and that none of the units have become unserviceable or damaged. If found damaged report the damage using DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you discover before, during, or after operation, unless you can fix them. You do not need to record faults you fix. The field deployment sequence is as follows:

This procedure assumes that the runway lights have been placed on the runway in the proper locations.

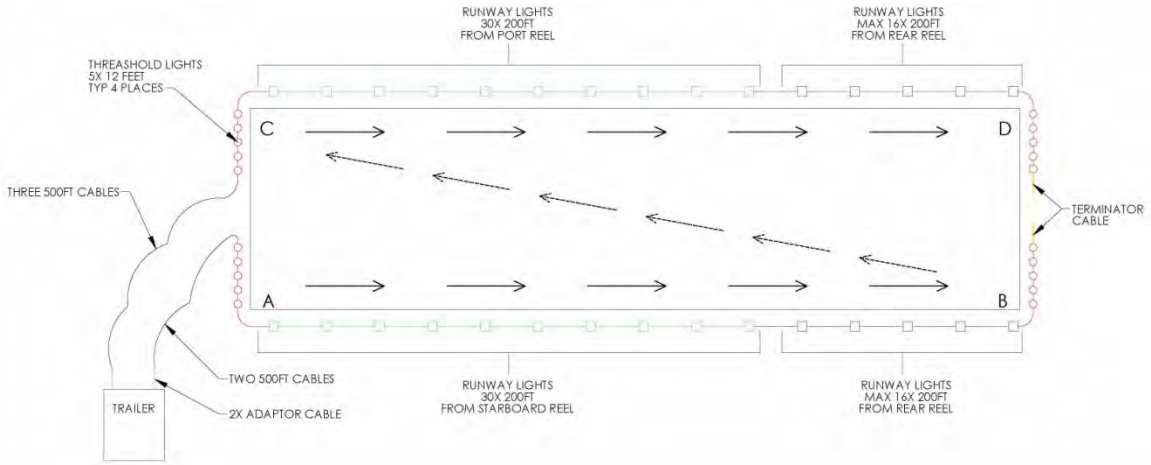

Figure 2-12: Schematic diagram of the layout of the charging cables for the runway lights. The trailer is located within 1,000 ft of a corner of the runway, which is labeled as "Corner A". The end of the runway where the trailer is located is arbitrarily called the "approach end" for identification purposes of the deployment procedure, the side of the runway from Corner A to Corner B is called the near side, and the side of the runway from Corner C to Corner D is called the opposite side. The arrows indicate the direction of towing the trailer along the runway. The solid arrows indicate deploying the cables and the dotted arrows indicate towing without deploying cables.

NOTE that, except for the direction of deployment of the cables, the following procedure may be changed according to the conditions of the runway or availability of manpower. For example, the cables may be deployed before the Power Supply Boxes are deployed.

a. preliminary to deployment

(1) Determine the final location of the trailer within 1000 feet of a corner of the runway. For identification purposes, this end of the runway will be called the approach end and the near corner of the runway will be called Corner A.

(2) Tow the trailer to Corner A of the approach end of the runway.

(3) Remove the canvas cover from the trailer. Stow the cover.

b. deployment of power supply boxes

(1) Remove 5 power supply boxes from one of the side cabinets and place one power supply box by each threshold light on one side of the runway. At each of these power supply boxes, connect the 3-ft charging cord to its associated threshold light.

(2) Tow the trailer down the near side of the runway from Corner A to Corner B, deploying one power supply box by each runway light. Connect the 3-ft long charging cord from each power supply box to its associated runway light. When at the other end of the runway, deploy five power supply boxes by each threshold light, and connect the 3-ft charging cord to its associated threshold light.

(3) Tow the trailer across to the opposite side of the runway to Corner D and deploy power supply boxes out of the other side cabinet to the threshold lights, runway lights and threshold lights as done above. Close and secure the side cabinet doors.

Steps 7 through

c. deployment of 520-ft charging cables to runway

(1). Tow the trailer to its final location off the side of the approach end of the runway, no more than 1,000 ft away from the corner of the runway.

(2) Untie the strap from the rear reel. Remove the strap from the rear reel and remove the dust cover from the end connector. Stow the strap and dust cover.

(3) Use the hydraulic system controller to set the rear reel to freewheel (see section 2-4d). The generator must be running in order to use the hydraulic system. Turn the rear reel manually to remove the 20 lengths of 12-ft cables. This can also be accomplished by setting the rear reel to PAY OUT and controlling its speed with the speed control. Put these cables aside to use for the threshold lights.

WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

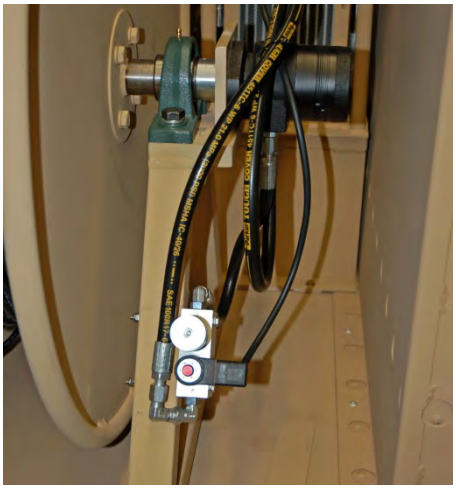

Figure 2-13: Rear reel freewheel switch. Turn counterclockwise and pull out to set to freewheel.

(4) With the trailer near its final location, start to remove 2 lengths of 520-ft cables from the rear reel while driving the trailer towards the near corner of the runway. (NOTE: the distance that the 520-ft cables must span is 500 ft. There is additional length to allow of flexibility over uneven terrain.) Stop inside the outer edge of the runway surface at the inner threshold light. When two lengths of 520-ft cables have been removed, disconnect the male/female connector at the end. Secure the end connector with the dust cover and secure the cable end by tying the supplied strap around the cables. Attach the male end of the two lengths of 520-ft cables to the power supply box for the inner threshold light.

NOTE: The 520-ft cables must be deployed in the direction from the final location of the trailer to the corners of the approach end of the runway. The cables are asymmetrical.

(5) Attach 4 lengths of 12-ft cables to the power supply boxes for the remaining threshold lights on this side of the runway, going from the inner threshold light to the corner threshold light. (NOTE: the distance that the 12-ft cables must span is 10 ft. There is additional length to allow for flexibility in placement of the threshold lights.)

(6) Drive back to the final location of the trailer. Remove 3 lengths of 520-ft cables from the rear reel while driving towards the other corner of the runway. Stop at the inner threshold light on the opposite side of the runway. When the three lengths of 520-ft cables have been removed, disconnect the male/female connectors at the end. Secure the end connector with the dust cover and secure the cable end by tying the supplied strap around the cables. Attach the male end of the 3 lengths of 520-ft cables to the power supply box for the inner threshold light.

(7) Attach 4 lengths of 12-ft cables between the power supply boxes for the remaining threshold lights on this side of the runway, going from the inner threshold light to the corner threshold light.

d. deployment of charging cables along near side

(1) Tow the trailer back to the near corner of the runway, Corner A, and end up facing down the runway.

(2) Pull the lock pin from the reel carriage slide on the starboard reel. **NOTE: The starboard cable reel is utilized in the above procedure because the trailer is towed on the runway. If the trailer must be towed off the runway, thus outside of the runway lights, then use the port cable reel.** Slide the reel carriage out to the end of its motion and lock in place with the lock pin. Remove the lock pin that secures the reel. Untie the strap from the rear reel. Remove the strap from the rear reel and remove the dust cover from the end connector. Stow the strap and dust cover. Make sure that the door on the side cabinet is closed and secured so that it does not interfere with deployment of the cables.

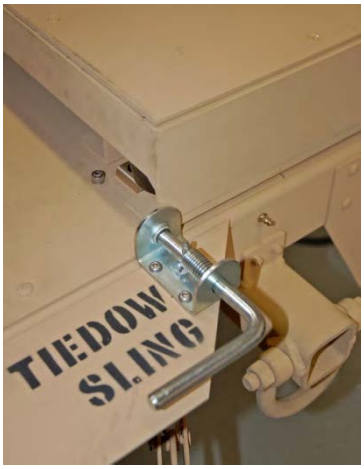

Figure 2-14: Lock pin for cable reel carriage when extended. Port side shown.

(3) Use the hydraulic system controller to set the starboard reel to freewheel (see section 2-4d). The generator must be running in order to use the hydraulic system. This can also be accomplished by setting the rear reel to PAY OUT and controlling its speed with the speed control.

WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

(4) Unwind enough of the first 210-ft cable and connect it to the power supply box for the corner threshold light. (NOTE: the distance that the 210-ft cables must span is 200 ft. There is additional length to allow flexibility in placement of the runway edge lights.) Deploy the 210-ft cables as the trailer is driven down the runway. **Make sure that the connector junctions are aligned with the power supply boxes.** Each cable is 210-ft in length and the nominal distance between the runway lights is 200 feet, so there will be some extra cable between each runway light. Slowly deploy the 210-ft cables until all 30 lengths of 210-ft cables have been deployed from this reel. Be careful at the end so that the cable connector of the last cable length is not yanked from the tie loop that is located on the center of the spool.

NOTE: The 210-ft cables must be deployed in the direction starting from the approach end of the runway. The cables are asymmetrical.

(5) Unpin the reel carriage and slide the reel carriage back onto the trailer. Secure the reel carriage with lock pins

Figure 2-15: Slide the starboard cable reel carriage back into place.

(6) Remove the strap that holds the cables on the rear reel. Remove the strap and dust cover from the first connector. Stow the dust cover and the strap. Connect the female connector of the first length of 210-ft cable onto the male connector of the last length of 210-ft cable from the side reel, or connect it to the power supply box for the runway light that corresponds to the end of the 30 lengths of 210-ft cable.. Slowly deploy the lengths of 210-ft cables until the end of the runway is reached, or until sixteen lengths of 210-ft cables have been deployed. **Make sure that the connectors are aligned with the power supply boxes.** Uncouple the connector from the last length of cable from the cable still on the rear reel. Secure the end connector with the dust cover and secure the cable end by tying the supplied strap around the reel. Attach the connector on the ground to the power supply box for the corner threshold light.

(7) Attach 4 lengths of 12-ft cables between the power supply boxes for the threshold lights.

(8) Connect a short looped, yellow-taped length of terminator cable to the inner threshold light power supply box to terminate this line.

e. deployment of charging cables along far side

(1) Tow the trailer back to the near end of the runway. Drive to the outside corner of the runway, Corner C, and end up facing down the runway.

NOTE: The 210-ft cables must be deployed in the direction starting from the approach end of the runway. The cables are asymmetrical.

(2) Pull the lock pin from the reel carriage slide on the port cable reel. **NOTE: The port cable reel is utilized in the above procedure because the trailer is towed on the runway. If the trailer must be towed off the runway, thus outside of the runway lights, then use the starboard cable reel.** Slide the reel carriage out to the end of its motion and lock in place with the lock pin. Remove the lock pin that secures the reel. Untie the strap from the rear reel. Remove the strap from the rear reel and remove the dust cover from the end connector. Stow the strap and dust cover. Make sure that the door on the side cabinet is closed and secured so that it does not interfere with deployment of the cables..

(3) Use the hydraulic system controller to set the port reel to freewheel (see section 2-4d). The generator must be running in order to use the hydraulic system. This can also be accomplished by setting the rear reel to PAY OUT and controlling its speed with the speed control.

WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

(4) Unwind enough of the first 210-ft cable and connect it to the power supply box for the corner threshold light. (NOTE: the distance that the 210-ft cables must span is 200 ft. There is additional length to allow flexibility in placement of the runway edge lights.) Deploy the 210-ft cables as the trailer is driven down the runway. **Make sure that the connector junctions are aligned with the power supply boxes.** Each cable is 210-ft in length and the nominal distance between the runway lights is 200 feet, so there will be some extra cable between each runway light. Slowly deploy the 210-ft cables until all 30 lengths of 210-ft cables have been deployed from this reel. Be careful at the end so that the cable connector of the last cable length is not yanked from the tie loop that is located on the center of the spool.

NOTE: The 210-ft cables must be deployed in the direction starting from the approach end of the runway. The cables are asymmetrical.

(5) Unpin the reel carriage and slide the reel carriage back onto the trailer. Secure the reel carriage with lock pins.

(6) Remove the strap that holds the cables on the rear reel. Remove the strap and dust cover from the first connector. Stow the dust cover and the strap. Connect the female connector of the first length of 210-ft cable onto the male connector of the last length of 210-ft cable from the side reel, or connect it to the power supply box for the runway light that corresponds to the end of the 30 lengths of 210-ft cable.. Slowly deploy the lengths of 210-ft cables until the end of the runway is reached, or until sixteen lengths of 210-ft cables have been deployed. **Make sure that the connectors are aligned with the power supply boxes.** Uncouple the connector from the last length of cable from the cable still on the rear reel. Secure the end connector with the dust cover and secure the cable end by tying the supplied strap around the reel. Attach the connector on the ground to the power supply box for the corner threshold light.

(7) Attach 4 lengths of 12-ft cables between the power supply boxes for the threshold lights.

(8) Connect a short looped, yellow-taped length of terminator cable to the inner threshold light power supply box to terminate this line.

f. final location of trailer

(1) Tow the trailer back to the trailer location and park the trailer near the ends of the two 520-ft cable segments. Lower the front jack stand, install the two rear stabilizers, set the wheel brakes, and chock the wheels to secure the trailer in place. Connect a male-male adapter cable onto the ends of each of the two 520-ft cable segments. Connect the other ends of the male-male adapter cables to the receptacles marked 400 VDC on back of the trailer.

> WARNING! If trailer is not coupled to the towing vehicle, ensure that the front leg is down and locked, the parking brakes are applied, the wheels are chocked, and the rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.

g. finish deployment

(1) Walk or drive along one side of the runway, stopping at each runway light to uncouple the connectors and attach these connectors to the associated runway light power supply box. Then walk or drive along the other side of the runway, stopping at each runway light to uncouple the connectors and attach these connectors to the associated runway light power supply box.

Figure 2-16: Runway light connected to power supply box and charging cables.

(2) Remove the grounding rod from the storage rack underneath the trailer. Connect the wire from the grounding rod to the ground lug on the rear of the trailer. Hammer the grounding rod into the ground.

(3) Remove the Channel Cable Protectors from the storage compartment below the trailer bed. Place the cable protectors over the cables where the cables cross the taxiways.

(4) Remove the stakes that are stowed under the generator. Use the stakes to hold down the cables. Typically there would be two stakes for each 210-ft and 520-ft cable length.

Tools Needed: hammer for the grounding rod and tie-down stakes

2-6 SEQUENCE OF RECOVERY

To recover the charging cables and auxiliary equipment, reverse the procedure for deploying the cables.
NOTE: The 210-ft cables must be recovered in the direction driving towards the approach end of the runway. The cables are asymmetrical.
NOTE: The 520-ft cables must be recovered in the direction starting from the corners of the approach end of the runway. The cables are asymmetrical.

Except for the direction of recovery of the cables, the following procedure may be changed according to the conditions of the runway or availability of manpower. For example, the cables may be deployed before the Power Supply Boxes are deployed.

a. preliminary to recovery of the charging cables

(1) Turn the two AC power switches on the rear of the trailer to the off position.

(2) Turn off the generator.

(3) Disconnect the adapter cables from the rear panel of the port side cabinet and from the 520-ft cables. Stow the adapter cables in the port side cabinet.

(4) Attach the trailer to a tow vehicle. Remove and store the rear stabilizers. Raise the front jack stand. Remove the chocks from the wheels.

b. recovery of auxiliary equipment

(1) Recover the stakes to hold down the cables. Stow the stakes in a bag under the generator.

(2) Recover the Cable Protectors. Stow the cable protectors in the rear storage compartment below the trailer bed.

(3) Disconnect the wire from the ground rod at the lug on the rear of the port side cabinet. Pull up the grounding rod. Stow the grounding rod and connecting wire in the rear storage compartment below the trailer bed.

c. recovery of power supply boxes

(1) Walk or drive to Corner A of the runway. Go to the inner threshold light and uncouple the connectors from its associated Power Supply Box. Pick up the Power Supply Box and stow in one of the side cabinets. To stow the Power Supply Boxes in the side cabinets, first fold the short cable length. Insert the Power Supply Box into a slot in a cabinet. Note that the bottom row of the starboard side cabinet is not used. Then wrap the remaining two cables and push them above the power supply box.

Figure 2-17: Stowing the Power Supply Box in a side cabinet. First fold the short cable length (left) and insert that side into a slot in a side cabinet (right).

Figure 2-18: Wrap the other two cords and insert them above the Power Supply Box.

(2) Continue to uncouple the Power Supply Boxes from the other threshold lights near Corner A. Pick up the Power Supply Boxes and stow in one of the side cabinets. Pick up the 12-ft cables and store them in a safe place.

(3) Walk or drive along the near side of the runway from Corner A to Corner B, stopping at each runway light to uncouple the connectors from the runway light power supply boxes. Couple the 210-ft cable end connectors together at each runway light location. At each runway light, pick up its associated Power Supply Box and stow in one of the side cabinets.

(4) Uncouple the Power Supply Boxes from the threshold lights near Corner B. Pick up the Power Supply Boxes and stow in one of the side cabinets. Pick up the 12-ft cables and store them in a safe place. Pick up the terminator cable and stow in the forward compartment of the port side cabinet.

(5) Go to Corner D. Uncouple the Power Supply Boxes from the threshold lights near Corner D. Pick up the Power Supply Boxes and stow in one of the side cabinets. Pick up the 12-ft cables and store them in a safe place. Pick up the terminator cable and stow in the forward compartment of the port side cabinet.

(6) Walk or drive along the far side of the runway from Corner D to Corner C, stopping at each runway light to uncouple the connectors from the runway light power supply boxes. Couple the 210-ft cable end connectors together at each runway light location. At each runway light, pick up its associated Power Supply Box and stow in one of the side cabinets.

(7) Uncouple the Power Supply Boxes from the threshold lights near Corner C. Pick up the Power Supply Boxes and stow in one of the side cabinets. Pick up the 12-ft cables and store them in a safe place.

d. recovery of charging cables along far side

(1) Tow the trailer to Corner D, and end up facing toward the approach end of the runway.

NOTE: The 210-ft cables must be recovered in the direction towards to the approach end of the runway. The cables are asymmetrical.

(2) If the trailer is on the runway, use the starboard side cable reel to recover 30 lengths of 210-ft cables. If the trailer is off the runway, use the port side reel. Pull out the lock pin that holds the side reel carriage in place. Pull the side reel carriage out so that it is fully extended beyond the trailer, and lock the slide into place. Make sure that the door on the side cabinet is closed. Start winding the cables on one of the side reels with a male connector. Place the male connector of a 210-ft cable in the yellow strap so that it is pulled over the top as seen from the rear of the trailer.

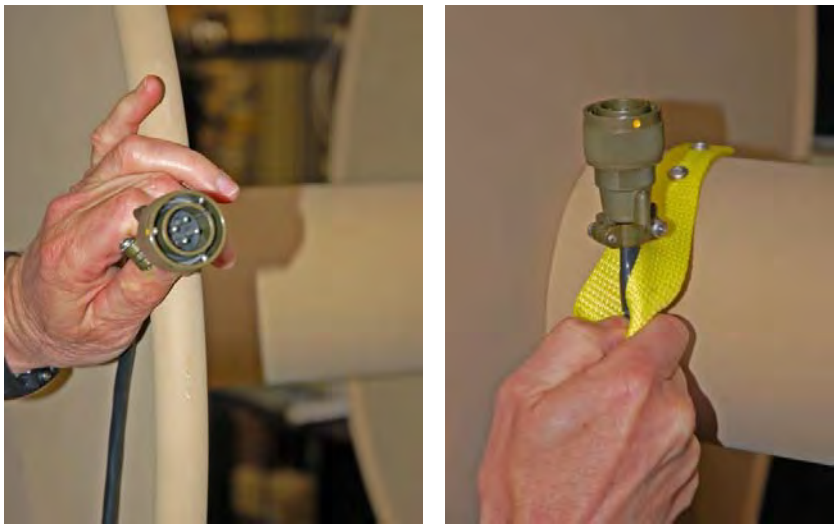

Figure 2-19: Start winding the 210-ft cables with a male connector (left). Then place the male connector in the yellow strap so that it is pulled over the top as seen from the rear of the trailer.

WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

(3) Start the generator.

(4) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(5) Use the hydraulic system controller to set the reel that is being used to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the runway. It is recommended that one person walk besides the trailer holding the hydraulic system hand-held remote controller and another person be located behind the cable reel to guide the cable onto the reel. Always leave a loop in the cable to prevent the cable from being pulled tight.

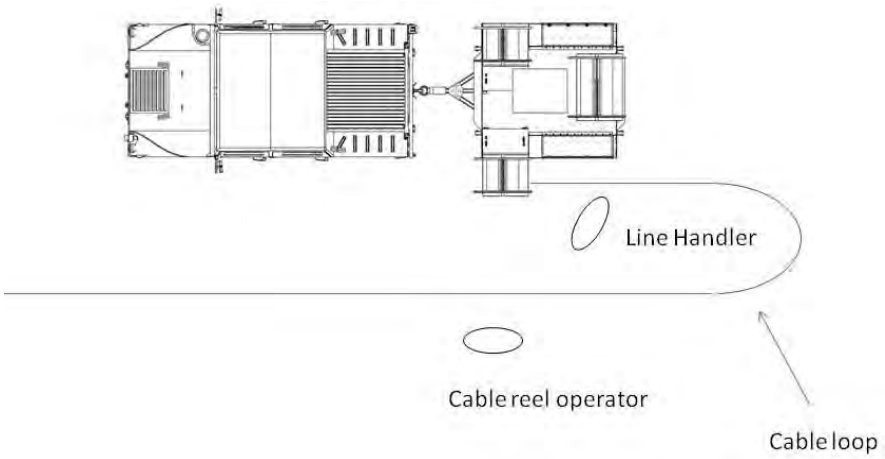

Figure 2-20: Leave a loop in the cable during cable recovery to prevent the cable from being pulled tight. As the vehicle drives forward, the cable reel operator with the hydraulic system remote controller walks along in a position to be able to see both the cable and the cable handler. The handler keeps the cable relatively even on the reel.

(6) Wind the cables until 30 of the 210-ft cables are on the reel. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(7) Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables. Unpin the reel carriage and slide it back into place on the trailer. Insert the lock pin to secure the reel slide in place.

Figure 2-21: Securing the end of the charging cables on a reel. The cable reel strap has a cap attached to one end. Screw in the cap, route the strap around the reel, thread through the buckle, and tighten.

(8) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

(9) To recover the remainder of the 210-ft charging cables from the far side of the runway onto the rear reel, connect the male connector of a 210-ft cable to the female connector of the spare 210-cables that remained on the rear reel or, if there are no spare 210-ft cables on the rear reel, place the male connector in the yellow strap so that it is pulled over the top as seen from the rear of the trailer.

(10) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(11) Use the hydraulic system controller to set the rear reel to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the runway. It is recommended that one person walk besides the trailer holding the hydraulic system hand-held remote controller and another person be located behind the cable reel to guide the cable onto the reel. Always leave a loop in the cable to prevent the cable from being pulled tight.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(12) Wind the cables until all of the remaining 210-ft cables on the far side of the runway are on the reel. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction. Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables.

(13) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

e. recovery of charging cables along near side

(1) Tow the trailer to Corner B, and end up facing toward the approach end of the runway.

NOTE: The 210-ft cables must be recovered in the direction towards to the approach end of the runway. The cables are asymmetrical.

(2) If the trailer is on the runway, use the port side cable reel to recover 30 lengths of 210-ft cables. If the trailer is off the runway, use the starboard side reel. Pull out the lock pin that holds the side reel carriage in place. Pull the side reel carriage out so that it is fully extended beyond the trailer, and lock the slide into place. Make sure that the door on the side cabinet is closed. Start winding the cables on one of the side reels with a male connector. Place the male connector of a 210-ft cable in the yellow strap so that it is pulled over the top as seen from the rear of the trailer.

WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

(3) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(4) Use the hydraulic system controller to set the reel that is being used to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the runway. It is recommended that one person walk besides the trailer holding the hydraulic system hand-held remote controller and another person be located behind the cable reel to guide the cable onto the reel. Always leave a loop in the cable to prevent the cable from being pulled tight.

(5) Wind the cables until 30 of the 210-ft cables are on the reel. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(6) Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables. Unpin the reel carriage and slide it back into place on the trailer. Insert the lock pin to secure the reel slide in place.

(7) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

(8) To recover the remainder of the 210-ft charging cables from the near side of the runway onto the rear reel, connect the male connector of a 210-ft cable to the female connector of the spare 210-cables that remained on the rear reel or, if there are no spare 210-ft cables on the rear reel, place the male connector in the yellow strap so that it is pulled over the top as seen from the rear of the trailer.

(9) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(10) Use the hydraulic system controller to set the rear reel to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the runway. It is recommended that one person walk besides the trailer holding the hydraulic system hand-held remote controller and another person be located behind the cable reel to guide the cable onto the reel. Always leave a loop in the cable to prevent the cable from being pulled tight.

(11) Wind the cables until all of the remaining 210-ft cables on the far side of the runway are on the reel. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(12) Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables.

(13) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

f. recovery of 520-ft charging cables to runway

(1) Tow the trailer to Corner C.

(2) Untie the strap from the rear reel. Remove the strap from the rear reel and remove the dust cover from the end connector. Stow the strap and dust cover. Connect the male end of the 520-ft cable to the female end of the cable on the rear reel.

(3) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(4) Use the hydraulic system controller to set the rear reel to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the three lengths of 520-ft cables. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction. Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables.

(5) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

(6) Tow the trailer to Corner A.

(7) Untie the strap from the rear reel. Remove the strap from the rear reel and remove the dust cover from the end connector. Stow the strap and dust cover. Connect the male end of the 520-ft cable to the female end of the cable on the rear reel.

(8) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(9) Use the hydraulic system controller to set the rear reel to HAUL IN and controlling its speed with the speed control as the trailer is being towed along the three lengths of 520-ft cables. It is recommended that one person walk besides the trailer holding the hydraulic system hand-held remote controller and another person be located behind the cable reel to guide the cable onto the reel. Always leave a loop in the cable to prevent the cable from being pulled tight. Note that the hydraulic winch system must be used to recover the cables. The reels will not freewheel in the HAUL IN direction.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(10) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel.

g. recovery of 12-ft charging cables

(1) Connect the male end of a 12-ft cable to the female end of the cable on the rear reel. Connect the remaining 12-ft cables together and lay them out behind the trailer with the male end near the rear reel.

(2) Set the speed knob on the hand-held hydraulic winch system controller to zero. Turn on the hydraulic system with the green button on the front of the hydraulic system panel.

(3) Use the hydraulic system controller to set the rear reel to HAUL IN and controlling its speed with the speed control until all of the lengths of 12-ft cables are on the reel.

NOTE: If at any time during operation something becomes uncontrolled or the cable gets tangled, push the large red emergency kill button in the upper left-hand corner of the hand-held controller to kill the hydraulic system. If you kill the system with the emergency stop, the emergency stop button must first be twisted and reset to the outward position, and then the system must be restarted at the control panel.

(4) Turn the speed dial on the hydraulic system controller to zero. Turn off the hydraulic system by pushing the red OFF button on the hydraulic system panel. Place a dust cover on the last female connector and secure the cable end by tying the supplied strap around the cables.

h. finish recovery

(1) Turn off the generator.

(2) Make sure that all auxiliary equipment is stowed in place, all of the cable reels are secured , the side cabinets are closed and locked, and the rear compartment is secured.

(3) Install the canvas cover over the trailer.

(4) Tow the trailer off the runway.

2-7 DECALS AND INSTRUCTION PLATES

The trailer chassis is identified by the data plate on the starboard side of the tongue.

THIS VEHICLE CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN.
SILVER EAGLE MANUFACTURING CO, INC.
PORTLAND, OREGON
MFR SERIAL NUMBER
VEHICLE CURB WEIGHT
PAYLOAD MAXIMUM
GROSS WEIGHT MAXIMUM
DATE OF DELIVERY
MFR P/N
01084-
14165

Figure 2-22: Identification plate for the trailer chassis.

The generator is identified by the data plate on its front, which can be accessed from the front of the trailer.

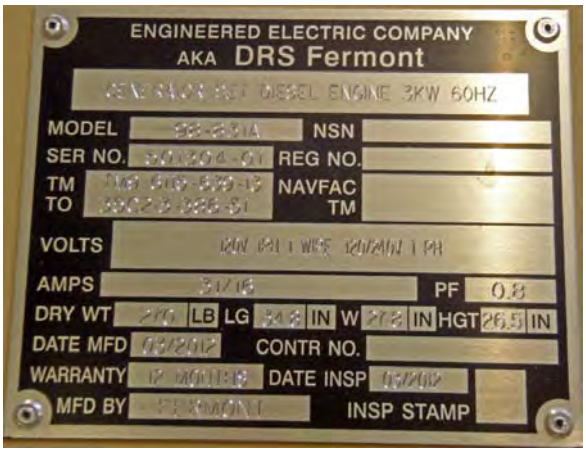

Figure 2-23: Identification plate for the generator.

2-8 PREPARATION FOR MOVEMENT

(1) Recover the grounding rod and ground wire. Stow in the under deck storage bin.

(2) Recover all tie-down stakes, cable protectors, charging cables, power supply boxes, terminator cables, adapter cables according to Section 2.5

(3) Turn off the generator, if it is running.

(4) Ensure that all equipment is properly stowed and the cabinets are secured. Ensure that the cable ends and reel are secured.

(5) Couple the HMCT trailer to towing vehicle.

(6) Raise the front support leg. Release both hand brakes. Remove chocks from both wheels. Remove both rear stabilizers and place in storage location at rear of trailer.

(7) Deploy the canvas cover and secure to the trailer along all edges.

SECTION III. OPERATION UNDER UNUSUAL CONDITIONS

2-9 UNUSUAL ENVIRONMENT/WEATHER

For operation of the trailer chassis under unusual conditions see Army TM 9-2330-392-14&P.

For operation of the generator under unusual conditions see Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1).

For operation of the Power Distribution Unit, charging cables, and power supply boxes under unusual conditions refer to your Carmanah Runway Lighting product documentation.

a. Fording Streams

(1) After fording stream, remove canvas cover and check for debris. Remove all debris from the trailer; in particular check underneath the side reel carriages.

(2) If water reaches the Power Distribution units, wait until the water dries before operating the charging cables.

(3) If the water reaches the filter breather, the water is likely to be in the hydraulic fluid tank. Find the drain plug on the bottom perimeter of the tank in the rear. Drain the tank and replace the hydraulic fluid. Use petroleum-based hydraulic oil R&O type or ISO 32 46, or equivalent with a viscosity of 30 to 50 cSt.

CHAPTER 3

TROUBLESHOOTING PROCEDURES

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Section II.	HYDRAULIC SYSTEM ALTERNATIVE PROCEDURES	56
3-2	Remote controller radio failure	56
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SECTION I. OPERATIONAL FAILURE ACTION GUIDE

3-1 OPERATIONAL FAILURE ACTION GUIDE

The purpose of this operational failure action guide is to provide the organization level personnel with the immediate action required in the event of a failure.

a. Trailer

REEL CARRIAGE DOES NOT OPERATE
- CHECK: Securing pin/latch pulled?
  - ACTION: Pull pin to open latch.
- CHECK: Rollers for debris/blocking.
  - ACTION: Remove debris.
- CHECK: Rollers for cracks/damage.
  - ACTION: Replace damaged parts, re-adjust rollers.
- CHECK: Interference of trailer frame to carriage.
  - ACTION: Adjust rollers for proper operation.
- CHECK: Latching pin for secured and deployment positions.
  - ACTION: Adjust for proper operation.

b. Charging System

A 210-FT CABLE FAILS
- CHECK: Cord severed or connector pulled off?
  - ACTION: Use one of the spare 210-ft cables from the rear reel.

A 12-FT CABLE FAILS
- CHECK: Cord severed or connector pulled off?
  - ACTION: Use one of the spare 12-ft cables from the rear reel.

A TERMINATOR CABLE FAILS
- CHECK: Cord severed or connector pulled off?
  - ACTION: Use the spare terminator cable, located in the port side cabinet.

A 520-FT CABLE FAILS
- CHECK: Cord severed or connector pulled off?
  - ACTION: move trailer closer to corner of runway.
  - ALTERNATE ACTION: Charge one side of the runway at a time by swapping the 520-ft cables from one side to the other.

A POWER SUPPLY BOX FAILS
- CHECK: Cord severed or connector pulled off?
  - ACTION: Use spare Power Supply Box.

A POWER DISTRIBUTION UNIT FAILS
- ACTION: Charge one side of the runway at a time by swapping the 520-ft cables from one bulkhead connector for the 400 VDC to the other. Turn the AC power switch for the failed Power Distribution Unit to the off position.

c. Hydraulic System

HYDRAULIC REMOTE CONTROLLER DOES NOT COMMUNICATE

CHECK: Charge battery in remote controller. If that does not work, replace the rechargeable batteries with AA-type alkaline batteries.

ACTION: use tether to connect remote controller to hydraulic system electrical control box

HYDRAULIC REMOTE CONTROLLER FAILS

CHECK: use tether to connect remote controller to hydraulic system electrical control box

ACTION: control hydraulic system by manually operating control valves

HYDRAULIC SYSTEM FAILS

CHECK: main breaker in hydraulic system electrical control box

ACTION: Over ride control valves and turn cable reels manually.

SECTION II. HYDRAULIC SYSTEM ALTERNATIVE PROCEDURES

In case of failure of part or all of the hydraulic system, alternative procedures for deploying and recovering the charging cables are provided.

3-2 REMOTE CONTROLLER RADIO FAILURE

If the hydraulic system hand-held controller becomes unresponsive, couple the unit to the control box via the included wired tether. Turn the hydraulic system off at the control panel. Connect the control box to the remote controller with the twist connectors. Then restart the system with the button on the control panel.

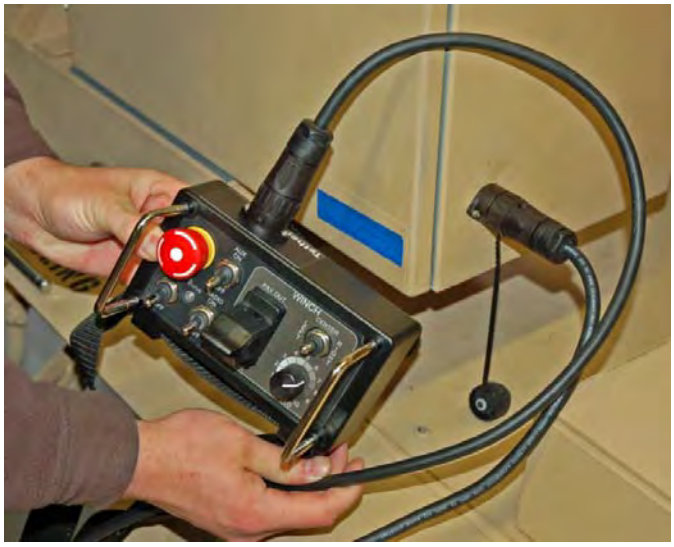

Figure 3-1: Hydraulic system controller connected directly to the control box.

If the remote controller function is restored by connecting with the tether, then it is likely that the batteries in the remote controller need replacement.

If connecting the tether does not restore the hydraulic system, try powering the entire system off. Open the control panel, and turn off the main breaker. Wait 3 to 5 minutes, then turn on main power at the main breaker switch.

Note that the following will occur if the hydraulic system is functioning:

(1) a green light will be steadily glowing on the 24 volt power supply;
(2) a blue light will be steadily glowing on the wireless receiver;
(3) an indigo back light will be illuminating the motor controller;
(4) a red light will flash inside the unit when communication is occurring between the hand-held controller and the receiver.

If any one of the above does not occur, then a problem exists. Further trouble shooting will be required by an experienced service person.

If the system still cannot be operated with the remote controller, but the pump is running, it may be manually operated.

3-3 HYDRAULIC SYSTEM MANUAL OPERATION

If the pump is operational (i.e. running), all functions can be controlled using the following methods.

Stand at the hydraulic power unit. The directional control valves are the upper most components on the hydraulic system assembly. The valve closest to the starboard side, controls the starboard side cable reel winch, the valve in the center controls the port side cable reel winch, and the valve closest to the port side controls the rear cable reel center winch.

Figure 3-2: Hydraulic system cable reel winch control valves. The proportional flow controller is in the lower right-hand side.

Be certain all personnel are clear of the cable reels before manually operating the hydraulic system.

The manual overrides are push and twist to lock on, or you may just push and release to momentarily activate. Push the valve override in on the cable reel winch you wish to select. While this is pushed in, slowly rotate the speed control manual override (RED) clockwise until the drum is turning at the desired rate. Once the desired flow rate and hence reel rotation rate is established, you may momentarily push, or push twist and lock directional controls.

When in manual powered operation, DO NOT leave the control valves unattended. Be prepared to shut system off at the control panel should something or someone becomes entangled in the cable. The winch will continue to rotate when you have engaged the manual twist lock on the directional control valves as long as the hydraulic power unit is on.

Upon completion, if you are not going to manually run the drum any further, twist the manual flow control knob out counter clockwise, and make sure all manual overrides on the directional control valves are in the non-locked position.

Prior to operation of full power control, be certain to disengage all manual overrides.

If complete failure of the hydraulic system occurs, and the hydraulic system will not to operate, then the cable reels may be operated by over-ridding the hydraulic system completely. The cable reels may be spooled or un-spooled by using the twist lock overrides at the directional control valves, or the twist lock overrides at the winch freewheel valves. Then manually turn the reels to spool off or on cable.

CHAPTER 4

MAINTENANCE INSTRUCTIONS

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SECTION I. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. General

Preventive Maintenance Checks and Services (PMCS) means systematic caring, inspecting, and servicing of equipment to keep it in good condition and prevent breakdowns. As the HMCT operator, your mission is to:

Be sure to perform your PMCS each time you operate, deploy or recover the system. Always do your PMCS in the same order, so it gets to be a habit. Once you have had some practice, you'll quickly spot anything wrong.

Do your BEFORE PMCS just before you operate the HMCT Trailer. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

Do your DURING PMCS while you operate the trailer. During operation means to monitor the trailer and its related components while it is actually being operated. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

Do your AFTER PMCS right after operating the HMCT Trailer. Pay attention to WARNINGs, CAUTIONs, and NOTEs.

Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you discover before, during or after operation, unless you can fix them. You DO NOT need to record faults that you fix.

b. PMCS Procedures

The HMCT trailer PMCS procedure begins with the trailer ready for transport. The only deviation here is that the soft cover must be removed prior to the PMCS inspection. The last step in the PMCS procedure is to replace the soft top and secure for transport.

Operator's Preventive Maintenance Checks and Services, lists inspections and care required to keep your HMCT trailer in good operating condition. It is set up so you can make your BEFORE operation checks as you walk around the trailer.

The ITEM NUMBER provides a logical sequence for PMCS to be performed and is used as a source of item number for the TM ITEM NO. column when recording PMCS results on DA Form 2404. The INTERVAL tells you when to perform a certain check or service. The LOCATION lists the item to check or service. The ITEMS TO CHECK/SERVICE PROCEDURE tells you how to perform the required check or service. Follow these instructions carefully. When instructed to do so, notify Unit Maintenance. NOTE: The terms "ready/available" and "mission capable" refer to the same status: Equipment is on hand and ready to perform its combat missions. (See DA Pam 738-750). The NOT FULLY MISSION CAPABLE IF column tells you when your HMCT Trailer is non-mission capable and why the HMCT trailer cannot be used.

When you perform PMCS, you will always need a rag or two. The following are checks that are common to the entire HMCT trailer.

Keep it Clean: Dirt, grease, oil, and debris may cover up a serious problem. Clean as you work, and as needed. Use dry cleaning solvent on all metal surfaces. Use detergent and water on rubber, plastic, and painted surfaces.

Rust and Corrosion: Check HMCT trailer, carriages, cabinet, and shelves for rust and corrosion.

Bolts, Nuts, and Screws: Ensure that none are loose, missing, bent, or broken. Tighten any that are loose.

Welds: Look for loose or chipped paint, rust, or cracks where parts are welded together. If you find a bad weld, notify Unit Maintenance.

Wiring Harness, Wires and Connectors: Inspect for cracked or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors where applicable. If you find damaged wiring, notify Unit Maintenance.

Hydraulic system filter: The tri-color filter indicator gauge will point in the green area if the filter condition is operating at optimum level. If pointing in the yellow, then be prepared to replace the filter element. In pointing in RED, do not use the hydraulic system until the filter element has been replaced. The filter element is Parker Hannifin Corporation PT series disposable filter cartridge 936756.

Maintenance of hydraulic fluid: If there is metallic powder, dust, water, or other foreign material in the hydraulic fluid, drain the hydraulic fluid and replace with clean hydraulic fluid. The drain is located on the bottom perimeter of the tank in the rear. Use petroleum-based hydraulic oil R&O type or ISO 32 46, or equivalent with a viscosity of 30 to 50 cSt.

To check for "operating condition", look at the component to see if it is serviceable.

c. Operator's Preventive Maintenance Checks and Services Before Deployment

ITEM NUMBER: 1
INTERVAL: Before
LOCATION: Front, sides, under deck, and rear latches, quick-release pins, clips, ties, and etc.
ITEMS TO CHECK/SERVICE PROCEDURE: Visually verify that all latches, buckles, quick release pins, straps and ties are present and secure.
NOT FULLY MISSION CAPABLE IF: Any latch, pin etc. is missing, broken, damaged or otherwise not useable so as to interfere with operation.

ITEM NUMBER: 2
INTERVAL: Before
LOCATION: Port side cabinet, starboard side cabinet.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that all Power Supply Boxes are present, cords are intact, and connectors are operational.
NOT FULLY MISSION CAPABLE IF: Any two Power Supply Boxes are missing or damaged.

ITEM NUMBER: 3
INTERVAL: Before
LOCATION: Starboard side cabinet.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that terminator cables are present, cord is intact and connector is operational
NOT FULLY MISSION CAPABLE IF: Fewer than two terminator cables are functional.

ITEM NUMBER: 4
INTERVAL: Before
LOCATION: Starboard Side cabinet.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that adapter cables are present, cord is intact and connector is operational
Visually check for signs of damage. Check for missing hardware, lanyards, lock pins
NOT FULLY MISSION CAPABLE IF: Either adapter cable is missing or damaged.

ITEM NUMBER: 5
INTERVAL: Before
LOCATION: Starboard Side cabinet.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that keys are present, key lock functions, handle latches and unlatches, support rod supports cabinet door in open position. Visually check for signs of damage.

ITEM NUMBER: 6
INTERVAL: Before
LOCATION: Front - Generators
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for leaking fuel/oil, missing hardware, lanyards, lock pins. If leaking, notify Unit Maintenance.
NOT FULLY MISSION CAPABLE IF: Leak exceeds Class III.

ITEM NUMBER: 7
INTERVAL: Before
LOCATION: Rear - Rear Cable Reel
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for missing hardware, lanyards, and lock pins. Clear out any debris from under and around the reel.
NOT FULLY MISSION CAPABLE IF: Damage is evident that prevents the reel from turning freely or locking in place.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

ITEM NUMBER: 8
INTERVAL: Before
LOCATION: Front - Cable Reel carriages
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for missing hardware, lanyards, and lock pins. Clear out any debris from the carriage.
NOT FULLY MISSION CAPABLE IF: Damage is evident that prevents the carriage from sliding between its positions or locking in place.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

ITEM NUMBER: 9
INTERVAL: Before
LOCATION: Under Deck Storage.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that cable protectors and ground kit are present. Visually check for signs of damage. Check for missing hardware, lanyards, lock pins
NOT FULLY MISSION CAPABLE IF: Damage that affects performance is evident or parts are missing.

ITEM NUMBER: 10
INTERVAL: Before
LOCATION: HMCT trailer.
ITEMS TO CHECK/SERVICE PROCEDURE: Replace canvas cover and secure.
NOT FULLY MISSION CAPABLE IF: Cover is missing.

ITEM NUMBER: 11
INTERVAL: Before
LOCATION: Hydraulic system.
ITEMS TO CHECK/SERVICE PROCEDURE: filter element.
NOT FULLY MISSION CAPABLE IF: Tri-color gauge points to red area.

d. Operator's Preventive Maintenance Checks and Services During Transport

ITEM NUMBER: 12
INTERVAL: During Transport
LOCATION: HMCT trailer
ITEMS TO CHECK/SERVICE PROCEDURE: During transport, check to verify that no items have become damaged/missing/malfunctioned.
NOT FULLY MISSION CAPABLE IF: Any damage/missing/malfunction occurs and there is no on-board spare.

e. Operator's Preventive Maintenance Checks and Services During Deployment

ITEM NUMBER: 13
INTERVAL: During Deployment
LOCATION: HMCT trailer
ITEMS TO CHECK/SERVICE PROCEDURE: Remove and stow canvas cover.
NOT FULLY MISSION CAPABLE IF: Canvas cover is damaged beyond repair and substitue is not available.

ITEM NUMBER: 14
INTERVAL: During Deployment
LOCATION: Starboard Side cabinet.
ITEMS TO CHECK/SERVICE PROCEDURE: Verify that keys are present, key lock functions, handle latches and unlatches, support rod supports cabinet door in open position. Visually check for signs of damage.

ITEM NUMBER: 15
INTERVAL: During Deployment
LOCATION: On deck - Generator
ITEMS TO CHECK/SERVICE PROCEDURE: Check operation and note if the generator does not operate properly.
NOT FULLY MISSION CAPABLE IF: Generator does not operate.

ITEM NUMBER: 16
INTERVAL: Before
LOCATION: Rear - Rear Cable Reel
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for missing hardware, lanyards, and lock pins. Clear out any debris from under and around the reel.
NOT FULLY MISSION CAPABLE IF: Damage is evident that prevents the reel from turning freely or locking in place.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

ITEM NUMBER: 17
INTERVAL: Before
LOCATION: Front - Cable Reel carriages
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for missing hardware, lanyards, and lock pins. Clear out any debris from the carriage.
NOT FULLY MISSION CAPABLE IF: Damage is evident that prevents the carriage from sliding between its positions or locking in place.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

ITEM NUMBER: 18
INTERVAL: Before
LOCATION: Under Deck Storage.
ITEMS TO CHECK/SERVICE PROCEDURE: Visually check for signs of damage. Check for missing hardware, lanyards, lock pins
NOT FULLY MISSION CAPABLE IF: Damage that affects performance is evident.

f. Operator's Preventive Maintenance Checks and Services After Deployment

ITEM NUMBER: 19
INTERVAL: After Deployment
LOCATION: HMCT trailer
ITEMS TO CHECK/SERVICE PROCEDURE: Ensure shelves, carriages, storage , quick-release pins are secure.
NOT FULLY MISSION CAPABLE IF: Damage is evident or parts are missing.

ITEM NUMBER: 20
INTERVAL: After Deployment
LOCATION: Hydraulic system.
ITEMS TO CHECK/SERVICE PROCEDURE: filter element.
NOT FULLY MISSION CAPABLE IF: Tri-color gauge points to red area.

g. Cleaning Agents

Cleaning is an AFTER operation service performed by the operator to maintain the HMCT trailer in a state of readiness. Facilities and material available for cleaning may vary in different operating conditions. The HMCT trailer must be kept as clean as available cleaning equipment, materials, and tactical situations permit.

WARNING! Dry cleaning solvent. P-D-680, is toxic and flammable. Always wear goggles and gloves, and use solvent in a well ventilated area only. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash eyes and get medical aid.

CAUTION! Do not allow cleaning compounds to come into contact with rubber, leather, vinyl, or canvas materials. Damage to equipment will result.

WARNING! Charging circuit uses 240VAC, 60 Cycles and 400 VDC. A hazardous condition exists if using water to clean HMCT trailer while power is on and available to trailer. DO NOT clean trailer with water while power is on. Failure to follow this instruction could result in serious injury or death to personnel.

CAUTION! If cleaning the trailer with water BE SURE the generator is off and circuit is NOT energized.

NOTE! After cleaning with water, when dry, replace charging cable and energize circuit.

FIRST AID DATA

FIVE SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

(1) Do not try to pull or grab the individual.
(2) If possible turn off the electrical power.
(3) If you cannot turn off the electrical power, pull, push or lift the person to safety using a wooden pole, a rope, or some other insulating material
(4) Send for help as soon as possible
(5) After the injured person is free of contact with the source of electrical shock, move the person a short distance away and immediately start resuscitation.

Refer to FM21-11 for first aid procedure.

SECTION II. MAINTENANCE

4-1 INSPECTION OF INSTALLED ITEMS

Perform any Inspection of Installed Items in Army technical manual TM 9-2330-392-14&P for the trailer chassis.

> WARNING! If trailer is not coupled to towing vehicle, ensure that front leg is down and locked, parking brakes are applied, wheels are chocked, and rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.
>
> WARNING! Ensure that weight load is evenly distributed. Too much weight at front will make trailer difficult to raise with front support leg. Too much weight at the rear will cause trailer to tip backward. Failure to follow these warnings may result in injury to personnel or damage to equipment.

Perform any Inspection of Installed Items in Army technical manual TM 9-6115-639-13&P (Marine Corps TM 10155A-OI/1) for the generator. **Adjust the AC output voltage of the generator to 240 VAC.**

Perform any Inspection of Installed Items as indicated in your Carmanah Runway Lighting product documentation.

Inspect condition of HMCT trailer by the following procedure:

a. Inspect condition of HMCT trailer by the following procedure. Starting with HMCT trailer ready for transport, observe condition of soft cover for any tears or fraying of fabric. Check condition of tie down straps and tie points for wear or damage. Note any discrepancies on DA Form 2404. Next remove cover and fold to temporarily store it in a convenient location.

b. Observe condition of the cable reels and carriages, look for any obvious damage, looseness of fittings or brackets, make sure the reel tie straps are in place and tight. Check condition of quick-release pins and be sure they operate as they should. Cycle movement of carriage and ensure it is functioning as it should. Check for signs of rust, corrosion, chipped paint, and accumulation of dirt and debris. Clean any spills of diesel fuel or oil from the generator. Make sure clamps used to secure generators are functioning properly. Check condition of cable on reel, make sure no fluids have accumulated on the wire, wipe any such fluid and be sure wire has not been damaged. Check lay of wire on reel and be sure it can rotate easily when needed. If it does not meet this criteria it may be necessary to unroll and re-roll wire.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

c. Normal action for carriages is to roll smoothly throughout its extent and back the same way. If there is any discrepancy with this feature rollers may need adjustment. Each axle for vertical loads have a grease fitting on it for routine lubrication. For type of lubrication see Section I (Preventive Maintenance Checks and Services) of this chapter. Lateral rollers do not have a grease fitting and must be manually greased at prescribed PMCS interval.

> WARNING! The cable reels have small clearances. Keeps hands clear of the pinch points when moving the cable reels. Be careful with placement of fingers and hands to avoid pinching.

d. Check to be sure quick-release pins are clean, have a light coating of oil, and function as they should. Be sure lanyard is attached to carriage and has no damage or fraying of cable.

e. Inspect side cabinets that houses the Power Supply Boxes, terminator cables, adapter cables, and hydraulic system hand-held remote controller. Note any obvious damage on DA Form 2404. Check shelves on each side of cabinet. Check the cords and connectors of the Power Supply Boxes for signs of damage. Check the cords and connectors of the terminator and adapter cords for sings of damage. Check shelves for accumulation of dirt and debris and clean if necessary. Shelves are designed to drain during times when cover is off and it is raining. Count proper number of Power Control Boxes, adapter cables, and terminator cables. Note any discrepancy on DA Form 2404.

f. At the rear of the trailer, inspect the under deck storage. Look for obvious damage to bin or cable protectors and ground rod kit inside. Note any discrepancy on DA Form 2404. Check the operation of the quarter-turn fasteners. Remove dirt and debris from the under deck storage. Check that the lanyards are attached and have no damage or fraying of cable.

g. Inspect all brackets, fittings, rivets, and bolts to ensure none are missing or damaged. Report any discrepancies on DA-Form-2404.

h. Replace soft cover on to the HMCT trailer.

4-2 CLEANING

Wash with clean water. A pressure washer and mild detergents may be used.

Avoid spraying water inside of the port side cabinet around the Power Distribution Units (located in the rear of the port side cabinet).

4-3 INSPECTION - ACCEPTANCE AND REJECTION CRITERIA

Acceptance criteria: If all equipment is in acceptable condition as outlined in inspection procedure, then acceptance is authorized.

If damage exists beyond all repair, or a unit does not function - after troubleshooting has not solved problem, then rejection of equipment in question is authorized.

4-4 PREPARATION FOR STORAGE OR SHIPMENT

a. Initial Setup for Storage

To prepare the HMCT trailer for storage, ensure above inspection has been performed and that the trailer has been designated mission capable. Move the HMCT trailer to its designated storage position and perform the following steps:

. WARNING! If trailer is not coupled to towing vehicle, ensure that front leg is down and locked, parking brakes are applied, wheels are chocked, and rear stabilizers are installed. Failure to follow this warning may cause trailer to roll or tilt, causing severe injury to personnel or damage to equipment.

(1) Apply both hand brakes.
(2) Securely chock both wheels.
(3) Remove both rear stabilizers from storage location and install at rear of trailer.
(4) Lower stabilizer feet until they contact ground.
(5) Do all PMCS Checks that apply to the before section of this manual. Replace canvas top and secure. Note any discrepancies on DA-Form-2404.

b. General

This section contains requirements and procedures for administrative storage of equipment. The requirements specified herein are necessary to maintain equipment in administrative storage in such a way as to achieve the maximum readiness condition. Equipment that is placed in administrative storage should be capable of being readied to perform its mission within a 24 hour period, or as otherwise prescribed by the approving authority. Before equipment is placed in administrative storage, a current PMCS should be completed and deficiencies corrected. Report equipment in administrative storage as prescribed for all reportable equipment. Perform inspections, maintenance services, and lubrication as specified herein. Records and reports to be maintained for equipment in administrative storage are those prescribed by DA Pam 738-750. A 10% variance is acceptable on time, running hours, or mileage used to determine the required maintenance actions.

c. Definition of Administrative Storage

The placement of equipment in administrative storage can be for short periods of time when a shortage of maintenance effort exists. Equipment should be ready for use within the time factors as determined by the directing authority. During the storage period, appropriate maintenance records will be kept.

d. Preparation of Equipment for Administrative Storage

(1) Select the best available site for administrative storage.
(2) Separate stored equipment from equipment in use.
(3) Conspicuously mark the area "Administrative Storage."
(4) Covered space is preferred. Open sites should be improved hardstand, if available.
(5) Unimproved sites should be firm, well drained, and free of excessive vegetation.

e. Storage Plan

Store equipment so as to provide maximum protection from the elements and to provide access for inspection, maintenance, and exercising. Anticipate removal or deployment problems and take suitable precautions.

Take into consideration environmental conditions, such as extreme heat and cold; high humidity; blowing sand or dust, or loose debris; soft ground; mud; heavy snows; or combinations thereof, and take adequate precautions.

Establish a fire plan and provide for adequate firefighting equipment and personnel.

f. Maintenance Services

Prior to storage, perform the next scheduled Unit PMCS. Correct all shortcomings and deficiencies prior to storage, or obtain a deferment from the approving authority.

WARNING
Dry cleaning solvent. P-D-680, is toxic and flammable. Always wear goggles and gloves and use solvent only in a well ventilated area. Avoid contact with skin, eyes, and clothes, and DO NOT breathe vapors. DO NOT use near open flame or excessive heat. The solvent's flash point is 100°F to 138°F (38°C to 59°C). If you become dizzy while using cleaning solvent, immediately get fresh air and medical help. If solvent contacts eyes, immediately wash your eyes and get medical aid.

CAUTION
Do not allow cleaning compounds to come into contact with rubber, leather, vinyl, or canvas materials. Damage to equipment will result.

CAUTION
Do not direct water or steam under pressure against unsealed electrical components, or any exterior opening. Failure to follow this caution may result in damage to the equipment.

WARNING
The Generator output is 240 VAC 60 Cycles. A hazardous condition exists if using water to clean HMCT trailer while power is on and available to trailer. DO NOT clean trailer with water while operating the generator. Failure to follow this instruction could result in serious injury or death to personnel.

CAUTION
If cleaning the trailer with water be sure generator is off and circuit is NOT energized.

Cleaning: Clean the equipment of dirt, grease, and other contaminants, but do not use vapor degreasing.

Preservation: After cleaning and drying, immediately coat unpainted metal surfaces with oil or grease, as appropriate.

g. Inspection

Inspect and approve the equipment prior to storage. Do not place equipment in storage, or obtain a deferment from the approving authority. Inspection will usually be visual and must consist of at least a walkaround examination of all equipment to detect any deficiencies. Inspect equipment in open storage weekly and equipment in covered storage monthly. Inspect equipment immediately after any severe storm or environmental change. The following are examples of things to look for during a visual inspection:

(1) Low or flat tires
(2) Conditions of preservatives, seals and wraps
(3) Corrosion or deterioration
(4) Missing or damaged parts
(5) Standing water
(6) Any other readily recognizable shortcomings or deficiencies.

h. Services During Storage

Repair During Administrative Storage: Keep equipment in an optimum state of readiness. Accomplish the required services and repairs as quickly as possible. Whenever possible, perform all maintenance on site.

Exercising: Exercise equipment in accordance with the table below and the following instructions:

Vehicle Major Exercise: Depreserve equipment by removing only that material restricting exercise. Remove blocks and perform all before-operation checks. Couple trailer to towing vehicle and drive at least 25 miles (40 km). Make several left and right 90-degree turns. Make several hard braking stops without skidding. Operate all other functional components and perform all during and after operation checks.

Scheduled Services: Scheduled services will include inspection per section 4-1 above and will be conducted in accordance with table below.

Table 4-1. Scheduled Services

Weeks	2	4	6	8	10	12	14	16	18	20	22	24
PMCS						X						X
Scheduled services		X		X		X		X		X		X
Major Exercise												X

Corrective Action: Immediately take action to correct shortcomings and deficiencies noted. Record inspection and exercise results on DA Form 2404. Record and report all maintenance actions on DA Form 2407. After exercising, restore the preservation to the original condition. Replenish lubricants used during exercising and note the amount on DA Form 2408.

Rotation: Rotate items in accordance with any rotational plan that will keep the equipment in an operational condition and reduce the maintenance effort.

i. Preparation of Equipment for Shipment

Height and width of vehicles prepared for rail transportation must not exceed the limitations of AR 700-15. Whenever possible, local transportation personnel must be consulted about limitations of particular railroad lines to be used for movement in order to avoid delays, dangerous conditions, or damage to equipment.

Loading and blocking procedures for flatcar shipment must be in accordance with pamphlet number MD-7, Rule Governing the loading of Defense Material on the Open-Top Cars of Association of American Railroads.

Loading and blocking of vehicles for highway shipment must be in accordance with Interstate Commerce Commission Publication “Motor Carrier Safety Regulations.”

Refer to FM 55-21, TM 55-601, and TM 743-200-1 for additional instructions on processing, storage, and shipment of material.

CHAPTER 5

REPAIR PARTS AND SPECIAL TOOLS LIST

Paragraph	Title	Page Number
Section I.	REPAIR PARTS	71
Section II.	SPECIAL TOOLS LIST	72

SECTION I. REPAIR PARTS

Repair procedures for the trailer chassis may be obtained from Army TM 9-2330-392-14&P.

Repair procedures for the generator may be obtained from Army TM-9-6115-639-13&P (Marine Corps TM 10155A-OI/1).

There are the following complete spare components:

- one Power Supply Box
- four 12-ft cables
- six 210-ft cables
- one termination cable

These spares are complete replacements; no assembly or tools are required.

SECTION II. SPECIAL TOOLS LIST

There are no special tools required.

Nomenclature	Quantity	Use and Application
none	-	-

APPENDIX A

DIAGRAMS

Paragraph	Title	Page Number
A-1	Charging Circuit Interconnection Diagram	74
A-2	Hydraulic System Electrical Diagrams	75
A-3	Hydraulic System Flow Diagram	78

SECTION A-1. CHARGING CIRCUIT INTERCONNECTION DIAGRAM

The 240 VAC, 60 Hz output from the generator is input to two Power switches on the rear of the port side cabinet. The output from each power switch is fed to a Power Distribution Unit that is located in the rear of the port side cabinet. The Power distribution Units each convert the 240 VAC, 60 Hz to 400 VDC. This 400 VDC is output through female bulkhead connectors on the rear of the port side cabinet. The charging cables attach to the bulkhead connector and carry the 400 VDC around a side of the runway. At each junction in the charging line there is a Power Supply Box that continues the 400 VDC circuit and leads power to a runway light to charge it.

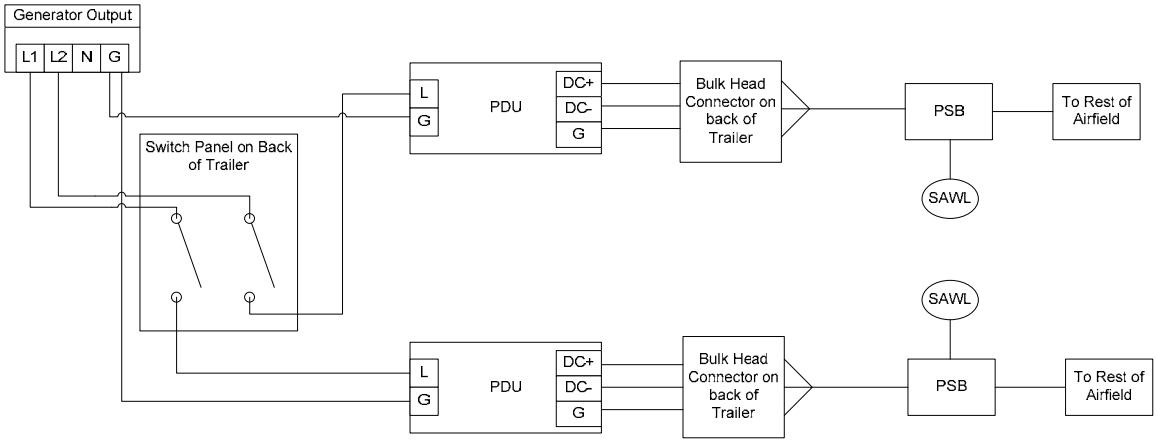

Figure A-1: Charging circuit interconnection diagram.

SECTION A-2. HYDRAULIC SYSTEM ELECTRICAL DIAGRAMS

The 240 VAC, 60 Hz output from the generator is input to the hydraulic system pump motor and a step-down transformer that lowers the voltage to 120 VAC. Switches then direct the 120 VAC to solenoids on hydraulic valves that control the actions of the hydraulic system.

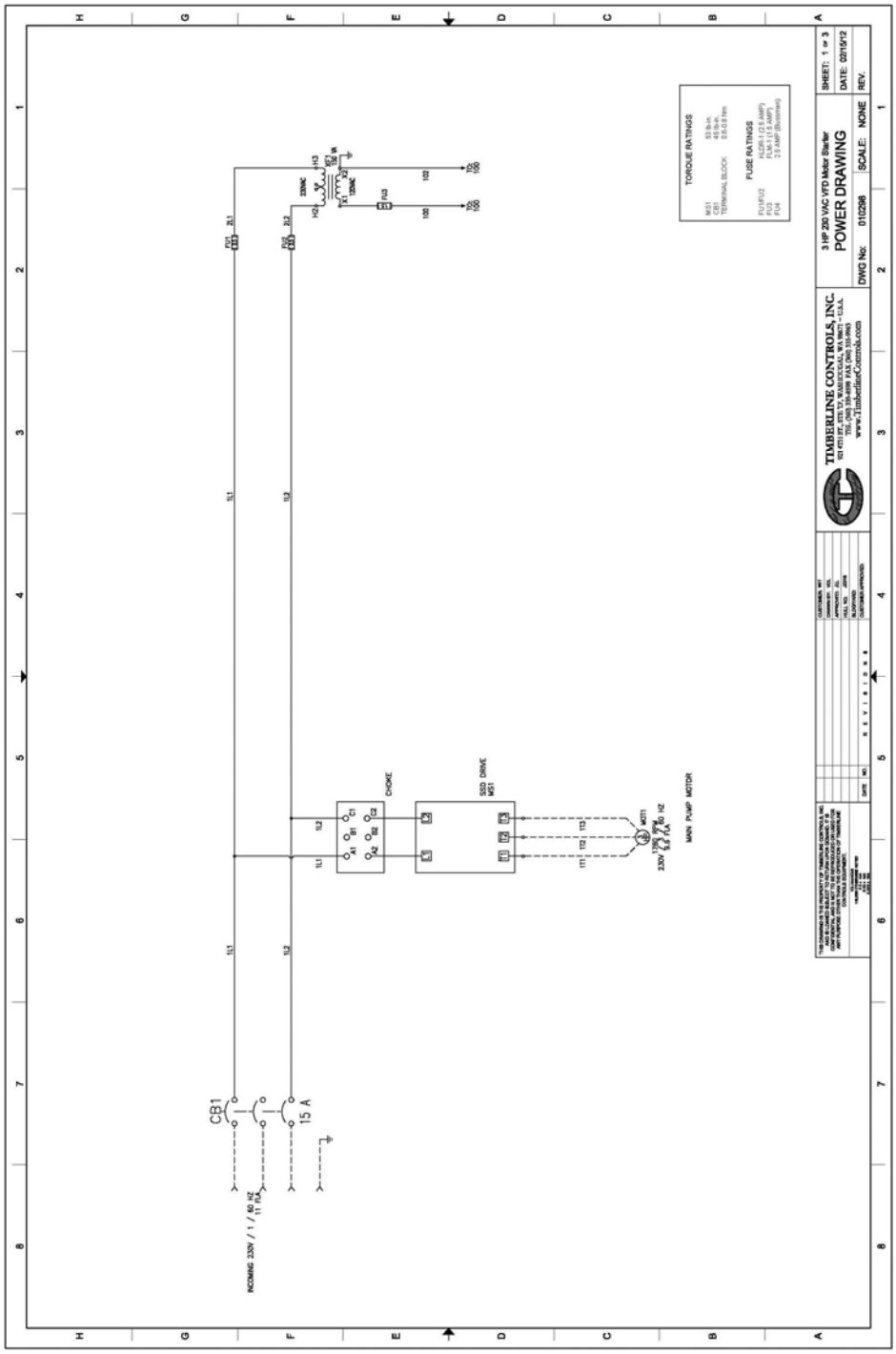

Figure A-2: Hydraulic system electrical wiring from 240 VAC source to the pump motor and to a transformer that steps down the voltage to 120 VAC.

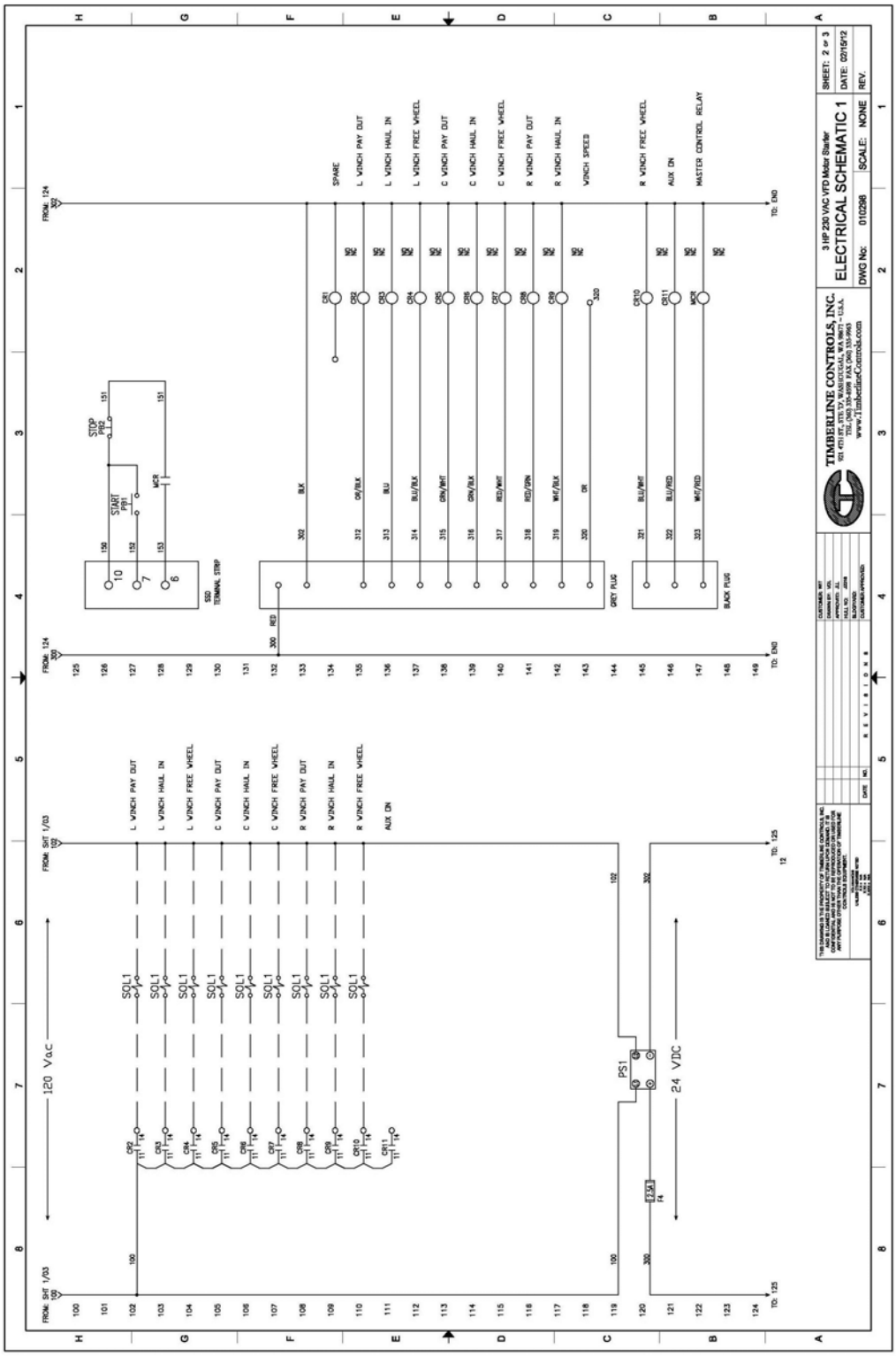

Figure A-3: Hydraulic system electrical wiring from step down transformer to the control solenoids.

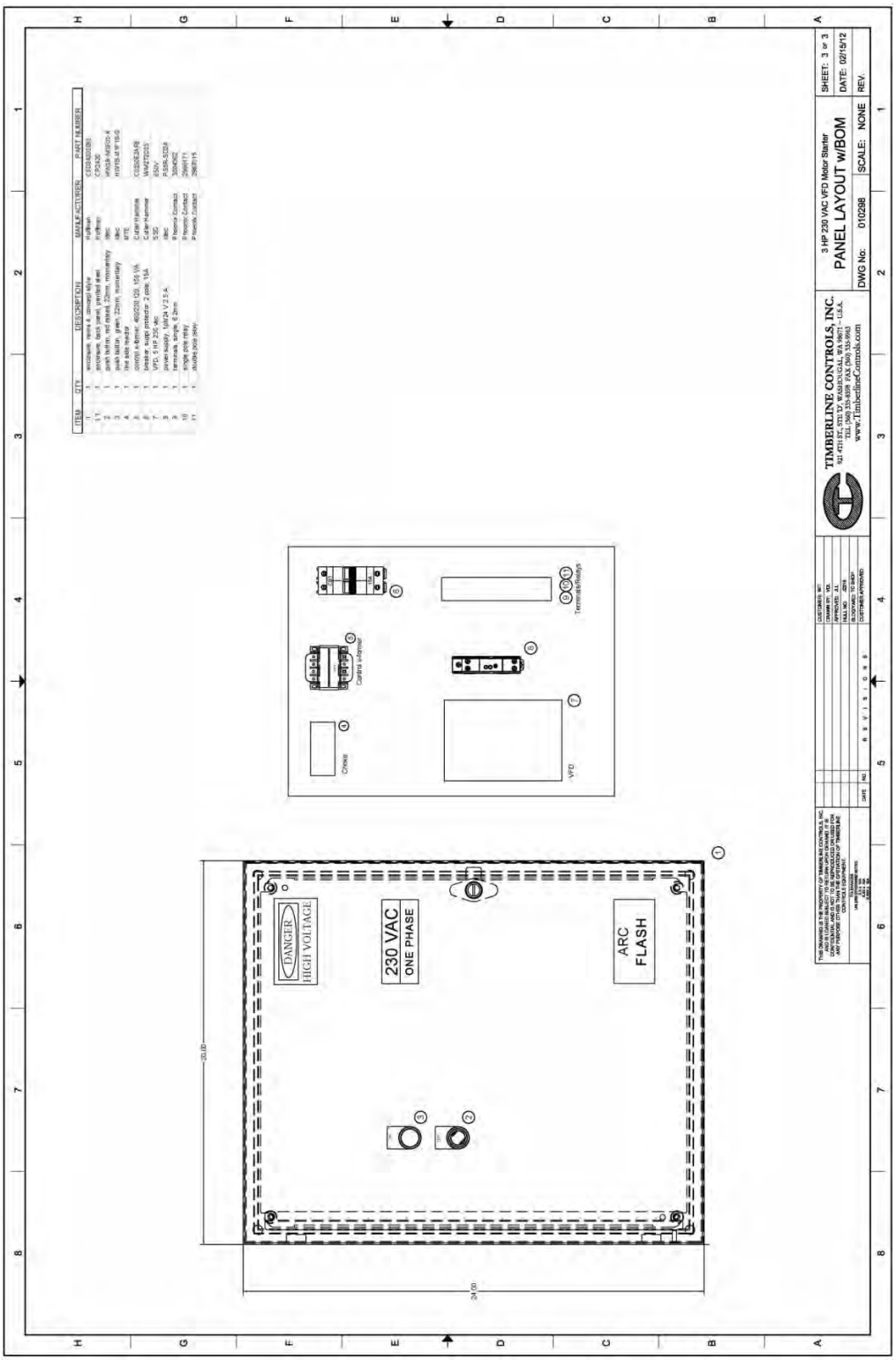

Figure A-4: Hydraulic system control box.

1. enclosure; 2. push button, red, momentary; 3. push button, green, momentary; 4. line side reactor; 5. step-down transformer 240 to 120 VAC; 6. circuit breaker, 2-pole, 15 A; 7. VFD, 5 HP 230 VAC; 8. 24V power supply, 2.5 A; 9. terminals; 10. single pole relay; 11. double pole relay

SECTION A-3. HYDRAULIC SYSTEM FLOW DIAGRAM

The hydraulic system utilizes a 3 HP variable volume vane-type pump that supplies 7.6 gpm at 1160 psi. A proportional flow controller is used to vary the speed of the cable reels. Wet-type solenoids operated directional control valves are used to control the flow to and direction of the cable reels

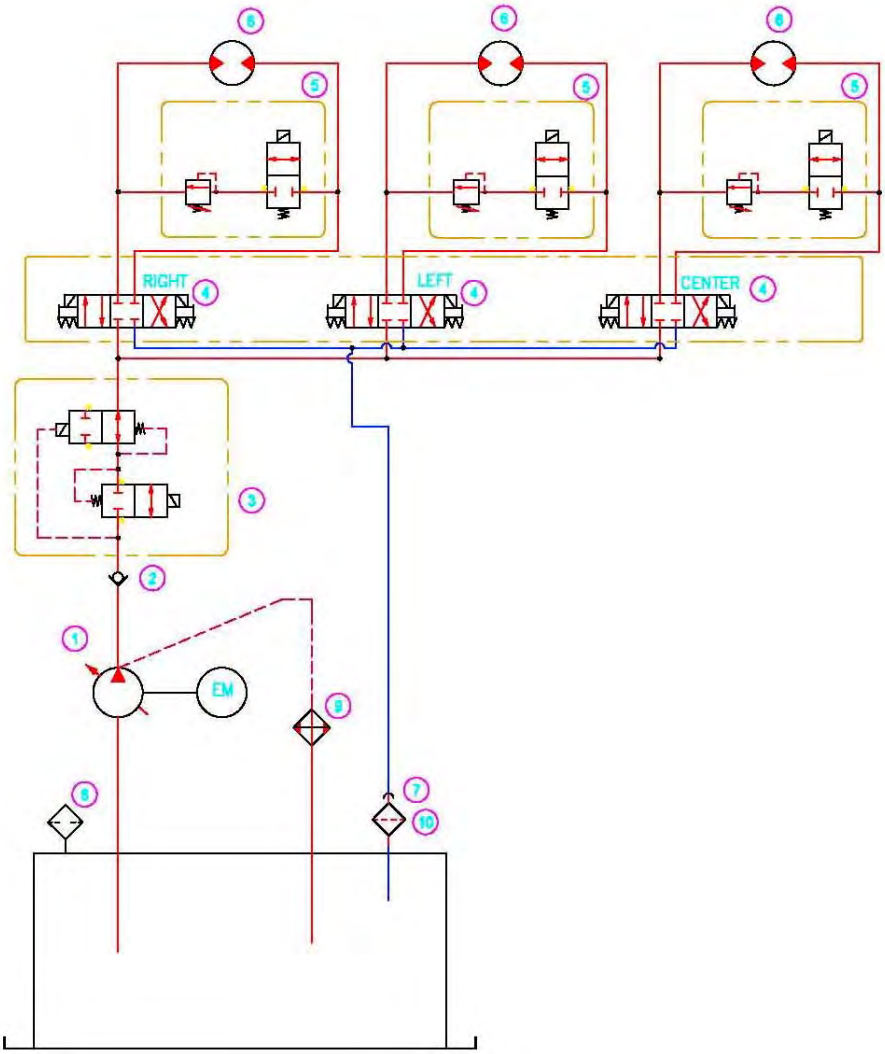

Figure A-5: Hydraulic system flow diagram.

1. pump Nachi UVN-1A-1A4-2.2E-4M-11
2. check valve Parker C-1020S
3. proportional flow control valve Hydra-Force PRF70-33BM-E-80-8T-N-24ER
4. directional control valve Nachi SA-001CSNC115E32

5a. motor free wheel valve Hydra-Force SV06-20K-0-N-115AG
5b. motor free wheel valve Hydra-Force RV06-20B-0-N-5
5c. motor free wheel valve Hydra-Force 7073910/6108090

6. winch motor Parker TB0080AS100AABK
7. return filter Parker PT2210QBGGS121
8. breather Donaldson P562482
9. heat exchanger Emmegi EM2010K-MM-3P-JE-805
10. return filter element Parker 936756

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